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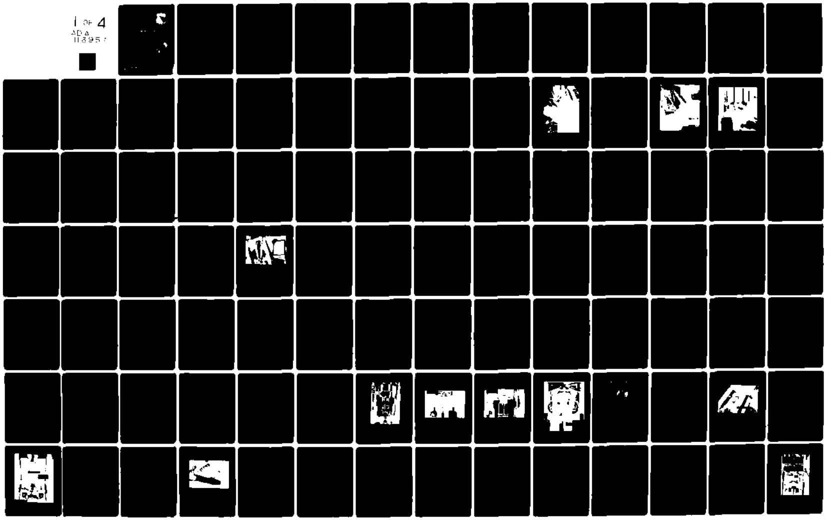

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COMPARATIVE VERTICAL IMPACT TESTING OF THE F/FB-111 CREW RESTRAINT SYSTEM AND A PROPOSED MODIFICATION

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The voluntary informed consent of the subjects used in this research was obtained as required by Air Force Regulation 169-3.

This report has been reviewed by the Office of Public Affairs (PA) and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

FOR THE COMMANDER

William L. Welde

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An impact test program was conducted to evaluate the operational F/FB-111 crew seat and restraint system and a proposed modification. A primary objective of the program was to compare human response to vertical impacts in the two restraint harnesses. A total of 67 human impact tests were performed on the Vertical Deceleration Tower up to 10 G peak, 26 ft/sec. Subjects were exposed to comparable impacts at different seat elevations in both harnesses to allow parametric analysis of the test results. Measured data included seat

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acceleration and velocity, head and chest translational acceleration components, triaxial forces acting on the seat and footrest, forces acting at the restraint harness attachments, and displacements of various body segments. The resultant head and chest accelerations were significantly greater in the modified harness than in the operational harness, regardless of seat elevation. On the basis of this comparison, the proposed modification to the F/FB-111 crew seat and restraint is not recommended for implementation. Future restraint harness modification proposals should be based on careful evaluation of all unconventional design features of the operational harness and should address all mechanisms by which adverse loads may be imposed on the seat occupant. In addition, future redesign efforts of the F/FB-111 escape system should provide improved landing impact attenuation.

PREFACE

This report was prepared by the Biomechanical Protection Branch, Biodynamics and Bioengineering Division of the Air Force Aerospace Medical Research Laboratory. On the basis of the test results described herein and other data presented elsewhere (Brinkley et al., 1981; Hearon et al., 1981), the proposed, modified F/FB-111 restraint system described in this report was not incorporated into the F/FB-111. The Engineering Change Proposal for this modification was cancelled at a Configuration Control Board in April 1981.

The impact facilities and data collection equipment were operated by the Scientific Services Division of the Dynalectron Corporation under Air Force Contract F33615-79-C-0523. Mr. Harold F. Boedeker was the Engineering Supervisor for the Dynalectron Corporation.

The test fixtures used during the experimental phase of the effort were designed and built by General Dynamics, Fort Worth Division. Mr. Andrew Shafer was the on-site engineering representative of General Dynamics during the test program.

Photographic support was provided by the 4950th Test Wing, Technical Photographic Division. Special acknowledgement is given to Mr. Paul Creiger for operation of the high speed motion picture cameras and to the many personnel who provided still photography coverage.

Anthropometric measurements of the test subjects were collected by Mr. Charles E. Clauser, Dr. Kenneth W. Kennedy, and Lt Col Maureen Lofberg of the Workload and Ergonomics Branch, Human Engineering Division of the Air Force Aerospace Medical Research Laboratory.

The authors wish to express their gratitude to the personnel of the Biomechanical Protection Branch who participated in the planning, preparation, and performance of the research program and in the preparation of this report. Special commendation is also given to the Air Force officers and airmen who volunteered to participate in the impact tests. The devotion, skill, and professionalism of the entire team of government and contractor personnel were vital to the successful and safe accomplishment of this evaluation.

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Section 1

INTRODUCTION

A. BACKGROUND

The F/FB-111 escape system was developed between 1963 and 1967. It was the first multi-place escape system to provide emergency egress by severing the entire crew station from the aircraft fuselage. Earlier efforts to provide an encapsulated escape capability for multi-place aircraft, such as the B-58 and B-70 bombers, utilized individual systems for each crew station.

Numerous aeromedical problems were encountered during the development of the F/FB-111 escape system. Perhaps the most significant of these was the severity of the acceleration environment experienced by the crewmembers during the escape sequence. The accelerations encountered during the ejection and the landing impact phases of the escape sequence were, under certain conditions, higher than levels considered to be acceptable. These acceleration environments have recently been reviewed in considerable detail (Brinkley et al., 1981).

Ejection tests of the crew module, for example, accomplished from a rocket propelled sled, revealed that the amplitude and duration of the acceleration measured at the crew seat increases as the ejection airspeed increases (Carney & Melvin, 1966; Hatcher, 1966; Hefti, 1967; McCauley, 1966; and McCauley & Melvin, 1966). Utilizing only the vertical axis acceleration data obtained in these tests, the probability of vertebral compression fracture was estimated as a function of ejection airspeed. The probability of vertebral fracture was estimated using the Dynamic Response Index (Payne, 1965). The Dynamic Response Index (DRI) is based on a simple lumped parameter mathematical model that has been correlated with a probability of vertebral fracture in operational USAF ejection seats (Brinkley et al., 1971). Since only the vertical component of the acceleration data was used in these estimates and there were large accelerations in the X axis at higher airspeeds, it was assumed that the calculated DRI values would tend to underestimate the actual probability of vertebral fracture in these cases.

A DRI value of 18 corresponds to an estimated probability of vertebral compression fracture of 5%. Therefore, the calculated DRI values plotted in Figure 1 show that below 450 KEAS (knots equivalent airspeed), the probability of such injury is estimated to be less than 5%. However, from 450 KEAS to 550 KEAS, the estimated probability of spinal injury increases from 5% to 50%.

The potential for vertebral fracture during landing impact of the crew module was also recognized during the development of this escape system. The calculated DRI as a function of crew module weight is shown in Figure 2 (Gossick & Mohr, 1968). These 23 values were obtained from the vertical acceleration data measured at the seat of the crew module in various landing impact tests (for example, Fricker, 1966). In 7 tests the probability of vertebral fracture was estimated to be lower than 5%. The probability of such injury was estimated to be between 20% and 50% in 12 of these tests and greater than 50% in 4 tests.

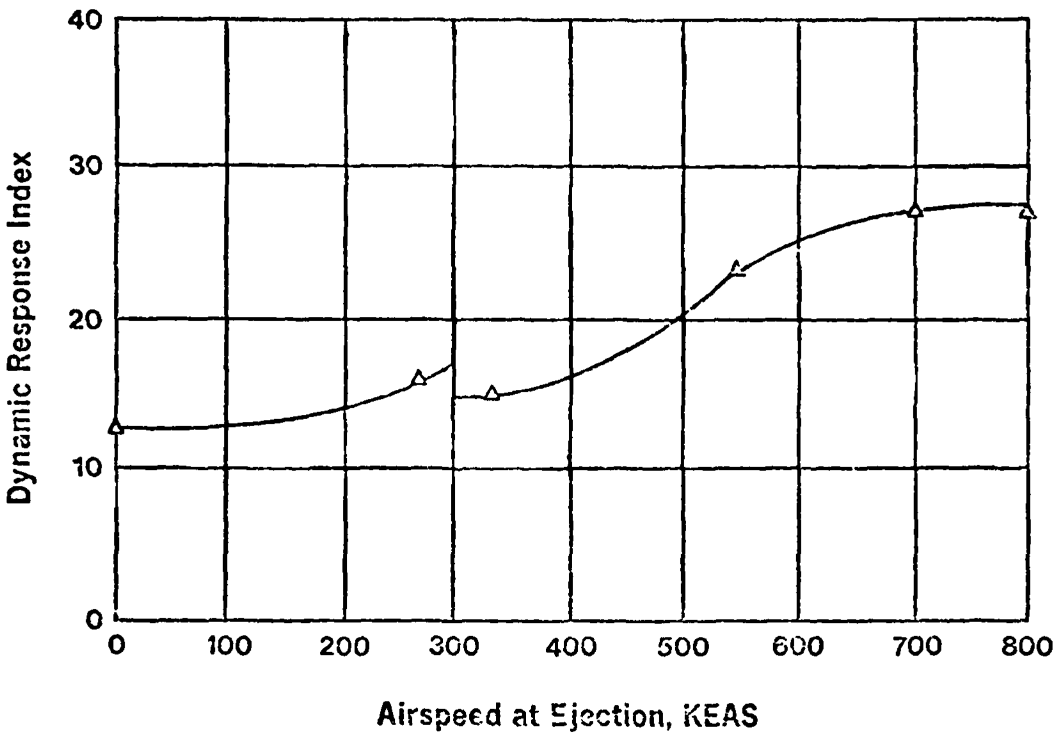


Figure 1. Dynamic Response Index Values Calculated from Qualification Ejection Test Data. (Discontinuity in curve occurs at the airspeed where a secondary rocket nozzle is opened to reduce $+G_z$ accelerations. Adapted from Gossick & Mohr, 1968.)

During module descent, the combination of surface winds and parachute oscillations may cause the horizontal velocity of the module at the time of impact to be as high as 43 ft/sec. Consideration of the sideward and/or fore-aft components of landing impact acceleration which occur as a result of this horizontal velocity, in addition to the vertical acceleration component, indicates that the resultant acceleration measured at the crew seat during this phase of the escape is beyond the human exposure limits given in USAF Military Specification MIL-C-25969B (Johnson, 1968; Peterson & Roberts, 1972). In order to decrease the module impact velocity and, in turn, the severity of the acceleration during this phase of the escape, incorporation of a retro-rocket system, which would act just prior to landing impact, was proposed. Subsequent landing impact tests of the module revealed that the impact tolerance criterion in MIL-C-25969B with such a modification could be met without a requirement for supplemental impact attenuation air bags (Peterson & Roberts, 1972). Owing to cost considerations, however, this modification was not pursued. The attenuation air bags were retained, leaving the spinal injury predictions noted above.

During the development of the F/FB-111 escape system, the restraint harness also came under close scrutiny. In fact, the current operational harness was not the restraint system which was originally utilized in the F/FB-111. The current harness was developed by the Royal Air Force Institute of Aviation Medicine in Great Britain. It was installed in the F/FB-11 crew module in 1970 after

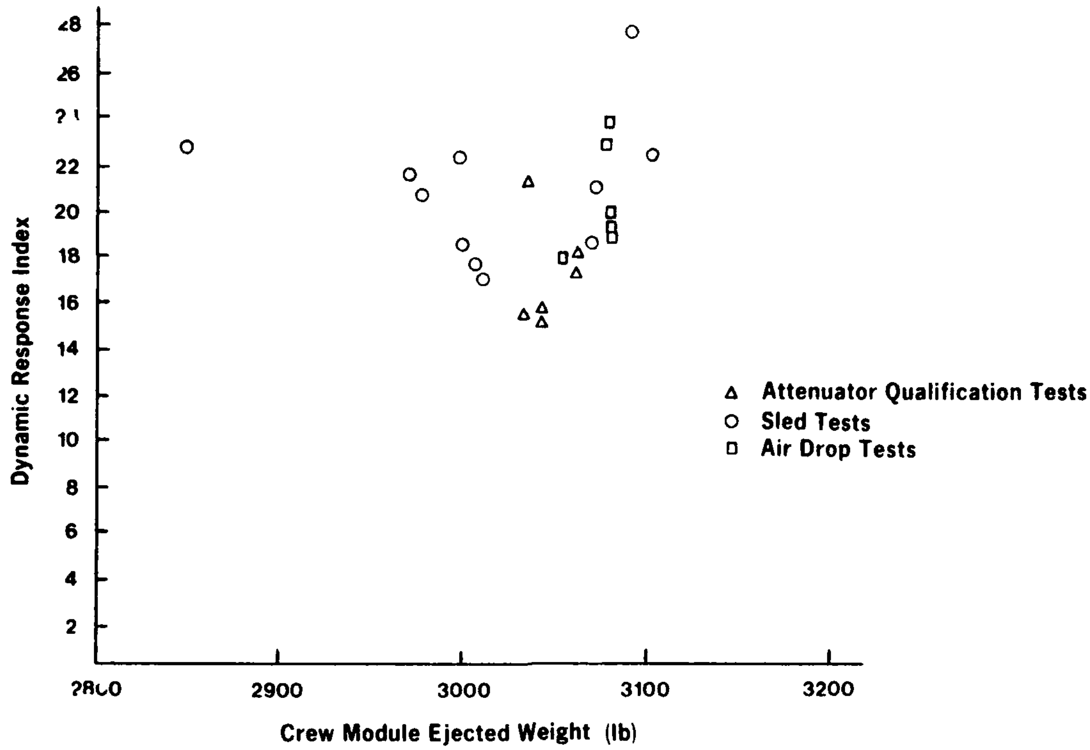


Figure 2. Dynamic Response Index Values Calculated from Ground Landing Impact Test Data. (Adapted from Gossick & Mohr, 1968.)

fore-aft and sideward demonstration impact tests indicated that the harness generally provided adequate restraint and subjectively was more comfortable than the original harness (Reader, 1967; Zaborowski, 1965). The vertebral fractures which occurred in the early F/FB-111 ejection experience with the original harness were apparently in the same general area of the spine (mid-thoracic) as the injuries experienced with the current operational harness. The original harness, it should be noted, did not have a shoulder harness yoke and reflection straps. The two harnesses are described in detail by Brinkley et al. (1981).

In 1977, a review of the operational ejection data by Kazarian indicated that the vertebral fracture rate among F/FB-111 ejectee survivors was even higher than anticipated. An injury rate of 40.3% (25 of 62) was reported for the period October 1967 to June 1977. Despite the previous concerns regarding the severity of the acceleration environment during ejection and landing impact described above, the majority of these injuries was attributed to the retraction phase of the escape sequence. Twenty-nine percent (18 of 62) of the survivors were believed to have incurred hyperextension or combined hyperextension-hyperflexion vertebral fractures (Kazarian et al., 1979). Furthermore, this injury mechanism assessment implicated negative (with respect to the reference waterline) inertia reel strap angles as the cause of these hyperextension injuries. It was suggested that elevation of the inertia reel and reflection strap anchor points would alleviate the hyperextension injuries presumed to

occur during retraction and the smaller number of hyperflexion injuries presumed to occur during landing impact.

The Life Support System Program Office of Aeronautical Systems Division (ASD/AES), Air Force Systems Command, Wright-Patterson Air Force Base, was assigned the responsibility for development of appropriate modifications to reduce or eliminate the high spinal injury rate associated with operational use of the F/FB-111 escape system. This task was defined in the Air Force Systems Command Program Management Document R-P 6097 (3) P.E. 64212F/2229 entitled "F-111 Crew Restraint System Redesign". The objectives of the restraint system redesign effort were to (1) eliminate the downward component of vertebral loading caused by the shoulder straps during retraction, (2) reduce forward and downward rotation of shoulders and back on landing impact, and (3) extend the seat back to provide upper back support during powered inertia reel retraction.

After a feasibility study exploring possible approaches to improve the crew seat and restraint sytem, General Dynamics Corporation, under Contract No. F33657-78-C-0651, proposed hardware modifications to achieve the aforementioned redesign objectives. The details of this proposed modification have been described elsewhere (Brinkley et al., 1981).

In June 1979, the Air Force Aerospace Medical Research Laboratory (AFAMRL) initiated a human impact test program to evaluate the proposed, modified F/FB-111 crew seat and restraint system. The research objectives of this program were to (1) assess the adequacy of the restraint as an impact protection device, (2) quantify the shoulder harness geometry for a range of subject anthropometry, and (3) uncover any areas of performance degradation. This demonstration test series revealed that negative inertia reel strap angles were still possible for some subjects in some seat configurations in the modified system and that lateral and vertical impact protection performance had apparently been degraded by the modification (Brinkley et al., 1981). As a result of these findings, additional impact tests were conducted to clarify the test results (Brinkley et al., 1982) and to directly compare the current operational harness to the proposed, modified harness. The results of the latter study are reported herein.

B. PROGRAM OBJECTIVES

The purpose of this research effort was to compare the operational F/FB-111 crew seat and restraint system with the proposed modification of the F/FB-111 crew seat and restraint system under identical impact test conditions. The experimental effort was designed to measure differences in the impact responses of volunteer test subjects as a function of restraint configuration, vertical position of the seat, and subject anthropometry. The influence of the angle of the inertia reel and reflection straps on the impact responses of the subjects was of particular interest.

The investigative effort also was intended to collect data which can be used as baseline data for future protective equipment evaluations and to provide data for ongoing research efforts to develop mathematical models to predict human impact responses.

C. PURPOSE AND SCOPE OF REPORT

This report (1) describes the impact tests accomplished to meet the program objectives outline above, (2) presents analysis and interpretation of the collected data, (3) summarizes the results of the evaluation, and (4) presents a final recommendation regarding the proposed modification.

Section 2

TECHNICAL APPROACH

A. EXPERIMENTAL DESIGN

The null hypothesis evaluated during this test program was that human inertial response to impact acceleration in the operational F/FB-111 harness is not significantly different from such response in the proposed, modified F/FB-111 harness. Vertical acceleration tests were considered to be crucial in this evaluation, since a significant number of the vertebral compression fractures incurred by ejectees were attributed to the inadequacy of the operational restraint on landing impact (Kazarian, 1977) and since the largest component of the resultant module acceleration on landing impact is in the Z axis (Brinkley et al., 1981). Also, the vertical impact tests which had recently been performed with the modified harness revealed increased vertical head acceleration with increasing inertia reel strap angles. This was interpreted as being indicative of degraded vertical impact protection performance in the modified harness. These facts, in addition to the absence of a vertical impact data base for the operational harness, made a direct comparison between the two harnesses mandatory. The vertical ($+G_z$) impact profile selected for use during this program has been used extensively at AFAMRL in the evaluation of other restraint systems with human subjects.

In order to minimize the potential for injury to human subjects, these tests were conducted at what is considered to be subinjury impact acceleration levels. The nominal 8 G peak carriage acceleration level was chosen as the orientation level for inexperienced subjects who had never before participated in tests on the Vertical Deceleration Tower (VDT). The nominal 10 G peak carriage acceleration level was selected as the experimental level, since some comparable test data at this level were already available and since, on the basis of prior experience, the risk of subject injury at this level was still acceptably low. At the same time, the forces acting on the subject at this exposure level are generally sufficient to overcome the forces created by voluntary muscle contraction, thereby producing a response suitable for comparative parametric analysis.

The sample of subjects selected to participate in this test program is comparable to the USAF flying population in terms of age, sex, and anthropometry. As the number of female flyers has increased, efforts have been made to introduce qualified female subjects into AFAMRL impact test programs. One female subject was among the eighteen volunteers who participated in this test program. The medical screening of all subjects prior to participation continues to be more highly selective than a routine USAF Flying Class I evaluation, resulting in a panel of supranormal volunteers (Hearon & Raddin, 1981). This difference in the populations of interest has a negligible influence on the significance of results of tests such as these, since all tests were conducted below anticipated injury threshold, even for a normal population. Such a conservative approach to subject screening is necessary to assure subject safety.

The experimental matrix for this test program is shown in Table 1. The factors influencing human inertial response which were investigated in this study were (1) the type of F/FB-111 harness (modified or operational) and (2) the seat vertical adjustment (which, in turn, directly determines the inertia reel strap

angles with respect to a reference horizontal for a given subject). All tests in the matrix were conducted with the plane of the backrest perpendicular to the plane of the seat and parallel to the impact vector, in the 90° seat back angle condition. This seat configuration was achieved by adjusting the headrest full forward and the seat pan full aft. (See Figure 3.) In this position, the contact point of the subject's flight helmet was 2¼ inches forward of the plane of the seat back. Upper extremity bracing was not a factor in this test program, since all subjects folded their hands in their laps during all exposures in the matrix. It should also be noted that tests in the C cell of the experimental matrix were completed as part of the F/FB-111 test program which preceded this study (Brinkley et al., 1982).

TABLE 1. EXPERIMENTAL MATRIX

VERTICAL SEAT ADJUSTMENT	F/FB-111 HARNESS	
	MODIFIED	OPERATIONAL
z_1	C	G
z_2	H	J

In Table 1, z_1 is defined as the seat vertical adjustment (relative to full down or $z = 0$) at which a subject had the largest positive inertia reel strap angle in the modified harness. This condition, in fact, corresponded to the full down seat position for all subjects. However, those subjects with relatively small sitting heights did not receive adequate helmet support in the full down seat position. Adequate helmet support was assumed if the approximate Frankfort horizontal plane (defined by the lowest points in the inferior orbital rims and the midpoint of the line connecting the highest points in the margin of the auditory meati) of the subject was in contact with the headrest. If necessary, the seat was elevated until minimum helmet support, according to the above definition, was provided. This seat elevation was designated as z_1 for that subject. It should be noted that the vertical position of the test seat was adjustable in one inch increments over a range of five inches. (See Figure 3.) The operational seat is continuously adjustable. The vertical position of the headrest, however, was fixed, as it is operationally.

In Table 1, z_2 is defined as the seat vertical adjustment at which a given subject had the largest negative inertia reel strap angle in the operational harness. Upward seat vertical adjustment was limited for all subjects by impingement of the inertia reel straps on the lower aspect of the headrest. Contact of no more than one-half the width of the inertia reel straps (inboard portions) was considered acceptable in the determination of z_2 and in the conduct of tests during the program.

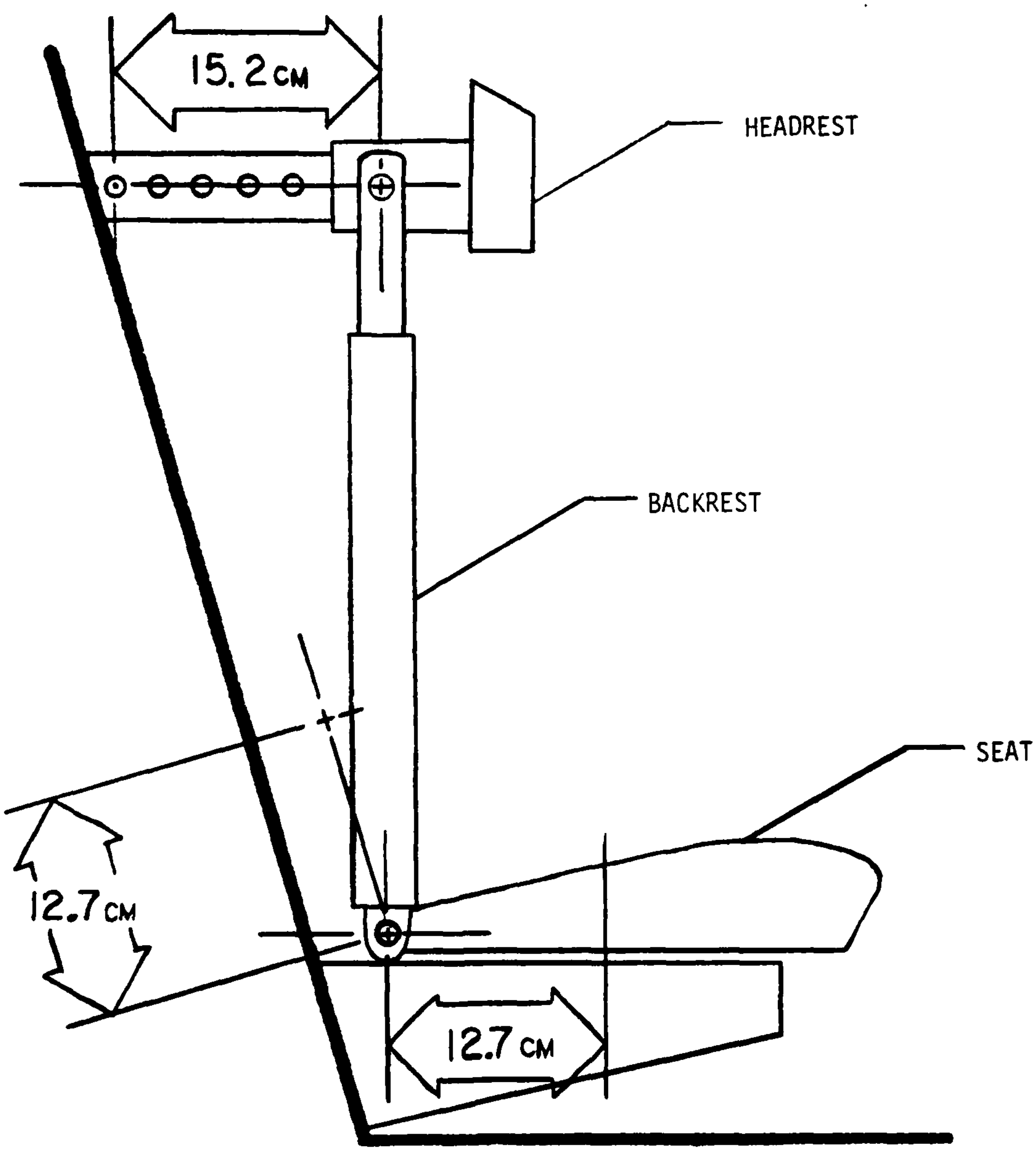


Figure 3. F/FB-111 Crew Seat Geometry.

The test conditions described in the preceding paragraphs were chosen in order to best achieve the objectives of this test program. For example, the 90° seat back angle position was selected for investigation because previous vertical impact tests of the modified harness had demonstrated that measured human inertial response could be expected to be more severe in this condition than in similar exposures with the seat back reclined. In particular, forward head accelerations and vertical seat pan reaction loads were significantly higher with the seat back angle at 90° than with the seat back angle at 103° or 110° (Brinkley et al., 1981). This allowed greater observability of the effects of harness variations.

Similarly, the seat vertical adjustments selected in the experimental design were considered crucial to achieve the program objectives. In the J cell of the matrix, for example, the largest negative inertia reel strap angle for each subject in the operational harness was explored. This condition is of considerable interest because, based on a review of the operational ejection data, Kazarian (1977) theorized that negative inertia reel strap angles were causally related to vertebral compression fractures incurred by ejectees not only during landing impact, but also during inertia reel retraction. This presumed correlation, in fact, resulted in a highly conservative approach which avoided negative inertia reel strap angles in the previous tests of the modified harness (Brinkley et al., 1981). However, a more recent review of the operational ejection data (Hearon et al., 1982) revealed that the likelihood of spinal injury is more probably related to the severity of the acceleration environment on landing impact and did not reveal a correlation with restraint harness geometry, as had been previously reported. (See also Section 5B.) The restriction of not exposing volunteers to conditions with negative inertia reel strap angles was, therefore, removed in the present study.

Also of considerable interest is the C cell condition of the experimental matrix, because the relatively large positive inertia reel strap angles in the modified harness in this test condition have been demonstrated to result in larger vertical head accelerations than similar exposures at higher seat elevations (Brinkley et al., 1981). In summary, the seat vertical adjustments were chosen to investigate the conditions in which the operational harness was originally presumed to provide less than adequate restraint and in which the modified harness was shown to degrade vertical impact protection. In addition, these conditions are operationally relevant, since the aircraft commander often adjusts the seat upward to assure adequate over-the-nose visibility and since the weapons systems operator often adjusts the seat downward to facilitate radar work. However, since crewmembers are not constrained by incremental vertical adjustment or by inadequate helmet support on the low side or strap impingement on the high side, the entire range of seat vertical adjustment that may used operationally was not evaluated in this test program.

Impact tests were conducted in all cells of the experimental matrix using an anthropomorphic dummy prior to initiating tests with volunteer subjects. As an additional safety precaution, a dummy test was performed each day prior to testing with human subjects.

The controlled variables during these experiments were the carriage drop height (and, in turn, the carriage acceleration and impact velocity), the type of F/FB-111 restraint harness (operational or modified) and the seat vertical adjustment. For the 8 G orientation exposures, the carriage drop height was

8.5 ft and for the 10 G experimental exposures, the carriage drop height was 11.0 ft.

The observable variables which were measured during these experiments included the restraint harness geometry (eg., inertia reel strap angles), the restraint harness static preloads, the restraint harness loads during impact (eg., reflection strap and lap belt loads), the forces (horizontal, lateral, and vertical) reacted at the seat pan and footrest during the impact, the triaxial translational acceleration components measured at the seat pan and at the subject's head and chest, and the displacements of photometric targets on the subject's body segments. The potential measurement error of the accelerometers, load cells, strain gages, and other devices utilized to make these measurements is detailed in Appendix A.

Significant unobservable variables during these experiments included the motion of each vertebral body and the force distribution along the vertebral column during the impact event.

B. EVALUATION CRITERIA

The electronic measurements obtained during these experiments included the tension-time histories of the various restraint harness straps measured at their attachment points, the force-time histories of the loads reacted into the seat pan and footrest, and the acceleration-time histories of the subject's head and chest and of the seat pan and drop carriage as well. It should be noted that the accelerometer arrays, attached to the subjects were, in general, rotating measurement coordinate frames which measured translational acceleration components summed with translational components resulting from angular motions. One implication of this observation is that, as the head rotated down and forward, vertical acceleration of the head with respect to the laboratory reference frame transitioned from a Z axis (vertical) to an X axis (fore-aft) measured acceleration with respect to the head. This situation is illustrated in Fig. 4. Another implication is that separation of translational accelerations of the effective center of gravity and translational acceleration components resulting from rotational motions cannot be achieved with the three orthogonal linear accelerometers utilized in these experiments. The relevant equations have been summarized elsewhere (Simons _et al._, 1979). For the purposes of this test program, it was adequate to measure the mixed translational data and assess rotational motion photometrically.

Evaluation of the entire measured acceleration-time histories of chest and head was accomplished by calculating Severity Indices (Gadd, 1966). These single parameters, which were derived by a weighted integral of the acceleration-time function taken over the interval of the impact ($SI = \int a^n(t)dt$, where $n = 2.5$), were used to compare the severities of impact responses. No exposure limit values were assigned to the chest or head acceleration Severity Indices. Instead, they were used only in a relative sense for purposes of comparison.

The Wilcoxon paired-replicate rank test (Wilcoxon & Wilcox, 1964) was the statistical technique selected to compare the peak values of specific measured parameters and to establish the statistical significance of observed trends in the data. Experimentally-measured parameters for each subject were arithmetically compared with the same parameters measured for the same subject in a

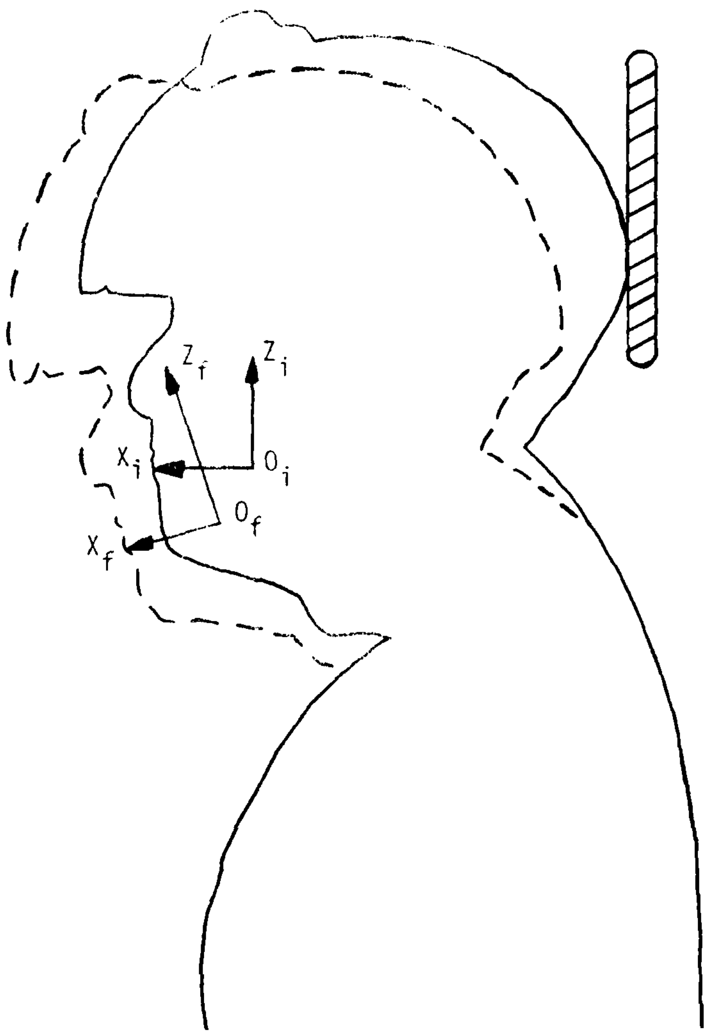


Figure 4. Rotation of the Head Accelerometer Array (Located at the Origin of the Coordinate System) During Vertical Impact.

different (but comparable) test condition, thereby establishing pair differences. When a sufficient number of pair differences for a specific parameter changed in the same direction for a variety of subjects, a trend was established as statistically significant by the Wilcoxon technique. The 90% confidence level was defined as the level of statistical significance for rejection of the null hypothesis, assuming a two-tailed test.

The advantages of employing this statistical technique are particularly noteworthy in these experiments. The technique is comparative and therefore is readily applied to the comparison of two restraint harnesses. Also, the method establishes each subject as his own control, thereby reducing the effects of biological variability on the data. In addition, a relatively small number of paired-replicates (6) is the minimum number required to permit a valid conclusion at the chosen significance level. This limits the total number of tests required to detect statistically significant trends in the test results.

The disadvantages of the Wilcoxon technique, however, must also be considered. Although the trend (direction) of a statistically significant difference in a given parameter is indicated, the magnitude of that difference is not quantified by the technique. (The difference between the means of the two sets of parameters being compared may be easily computed, however.) The method is also less powerful than, for example, the analysis of variance. As in any statistical technique, statistical significance can be computed, but practical significance must be judged.

Statistically significant trends in test parameters between two test conditions were critical in this comparative restraint harness evaluation. Generally, trends in specific parameters differ in practical importance. In this test program, for example, there was limited interest in the loads reacted into the lap belt, since all tests were conducted in the Z axis with an unreclined seat back, thereby minimizing variation in lap belt reaction loads. However, in view of the relatively high incidence of vertebral fractures experienced by F/FB-111 ejectees operationally, the more crucial considerations were the trends in the experimentally-measured seat pan reaction loads and the head and chest accelerations. At this time, the loads reacted at the seat pan are the best indirect measurement of the magnitude of vertebral column loading during impact.

In the final analysis, the overall distribution of statistically significant trends in all test parameters being compared generally assumes greater importance than the trend of any single parameter. At times, a "beneficial" trend in one parameter may be accompanied by a "detrimental" trend in another. In this circumstance, a careful evaluation of the "trade-offs" among parameters is necessary, in order to accurately assess which test configuration is "best" or perhaps which is the lesser of two evils. It is conceivable that, in some circumstances, such a determination may be impossible.

For ethical and moral reasons, it is not possible to design and conduct impact experiments in the laboratory with human subjects at operational exposure levels where there is a significant probability of serious injury. These tests, therefore, were performed at subinjury impact levels which have been demonstrated to be well within human tolerance and where the risk of injury is acceptably low. However, the levels were sufficiently high to overcome voluntary muscle resistance and approach the operational range. Extension of the impact accelerations could be expected to lead to increases in response until a non-linearity occurs in the form of injury. The statistically significant trends reported herein for this experimental level cannot be extrapolated to operational levels for the purpose of predicting injury rates. However, the trends discovered at this experimental level should be valid with increasing levels of impact until the non-linearities associated with injury are encountered.

Section 3

TEST EQUIPMENT, METHODS, AND FACILITIES

A. VERTICAL DECELERATION TOWER

The AFAMRL Vertical Deceleration Tower (VDT), shown in Figure 5, was used for the entire impact test series. This facility consists of a 60 ft vertical steel tower, which supports a guide rail system, an impact carriage, a hydraulic deceleration device, and a test control and safety system. The impact carriage which is used to carry the test specimen can be elevated to a maximum height of 42 ft prior to release. After release, the carriage falls until a plunger attached to the carriage enters a water-filled cylinder located at the base of the tower. The deceleration profile produced as the plunger displaces the water in the cylinder is a function of the free fall distance, the carriage and test specimen mass, the shape and size of the plunger, and the diameter of the cylinder orifice.

A typical acceleration-time history recorded on the impact carriage during this test program is shown in Figure 6. The 10 G test level mean carriage acceleration for the entire vertical test series was 10.5 G with an estimated standard deviation of 0.19.

B. CREW SEAT AND RESTRAINT SYSTEM

The crew seat used in the test program is a unit that was salvaged from an F-111 crew escape module. The seat was attached to the impact facility using a special structure that was designed and fabricated by the General Dynamics Corporation under Contract No. F33657-78-C-0651. This fixture, shown in Fig. 7, supported the seat and aircraft rudder control pedal footrest. The seat pan and the rudder pedals were instrumented to measure the loads reacted by the subject into these structures during the experiment. The design configuration of the seat and its components is described more completely elsewhere (Brinkley _et al_., 1981).

A modified headrest, shown in Figure 8, was used in all tests of the proposed, modified crew seat and restraint system. This headrest differs from the operational headrest in that 2.66 inches of the helmet support structure has been removed from the lower portion of the headrest. The aeromedical implications of this modification are described elsewhere (Brinkley _et al_., 1981).

The inertia reel was not used in the test program. It was replaced by a simple webbing clamp bar located at the centerline of the reel.

The same restraint harness was used for all tests in this series. However, the attachment geometry of the straps connecting the shoulder harness to the inertia reel and seat structure anchor points was varied. The modified restraint configuration is shown in Figure 8 and the operational configuration is shown in Figure 9. The reflection straps of the operational harness are attached to the upper portion of the seat back 24.09 inches above the seat reference axis (the intersection of the planes of the compressed backrest cushion and the seat cushion). The operational reflection strap attachment points move vertically as

Figure 5. AFAMRL Vertical Deceleration Tower and F/FB-111 Test Fixture Viewed from Below.

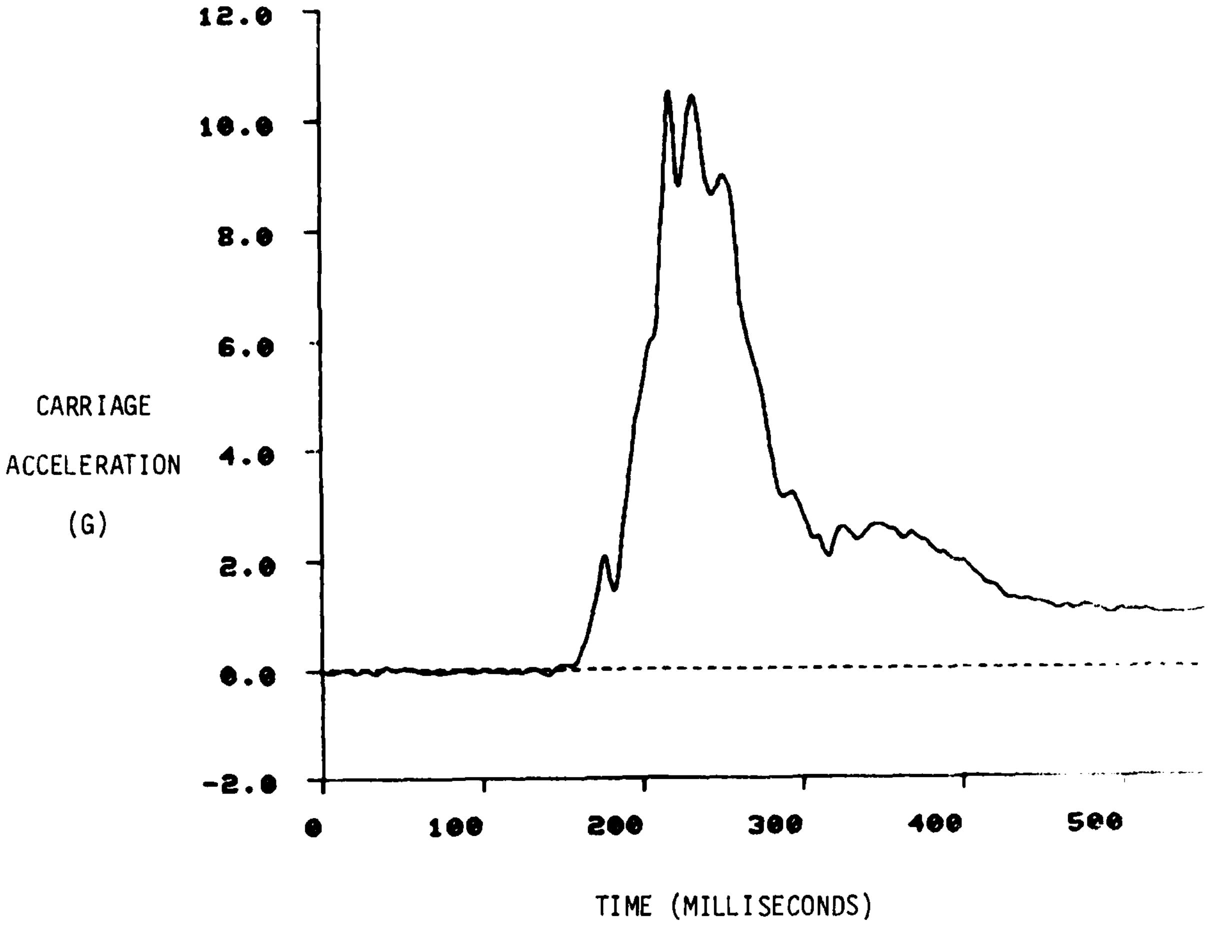


Figure 6. Typical Carriage Acceleration Profile.

the seat is moved up or down. In the proposed modification of the crew seat and restraint system, the reflection strap attachment points are located in the headrest structure (which does not move with seat vertical adjustment). These proposed attachment points (located at waterline 203.2) are 2.94 inches above the highest elevation which the attachment points can reach in the operational configuration and 7.94 inches above the lowest elevation. In addition, they have been moved 2.81 inches toward the center of the headrest. The inertia reel attachment points of the operational restraint system are located on a waterline (200.75) which is 27.5 inches above the lowest position of the seat reference axis. The proposed modification raises the load reaction point of the inertia reel straps by 1.9 inches by the use of two sets of rollers. The lower portion of the headrest has been removed in order to provide clearance for the higher strap locations.

Each restraint system was pretensioned prior to the impact experiment. The lap belt pretension was 20 $\pm$ 5 lb measured by strain gages mounted on the lap belt end attachment fittings. The total load acting on each shoulder strap was set at 14 $\pm$ 5 lb by measuring the loads at the end fittings of each reflection strap and using Lebow gages attached to the inertia reel straps. This preload procedure imposes a load on the subject which is lower than the maximum load (50 lb

Figure 7. Test Fixture with Rudder Pedal Support Structure.

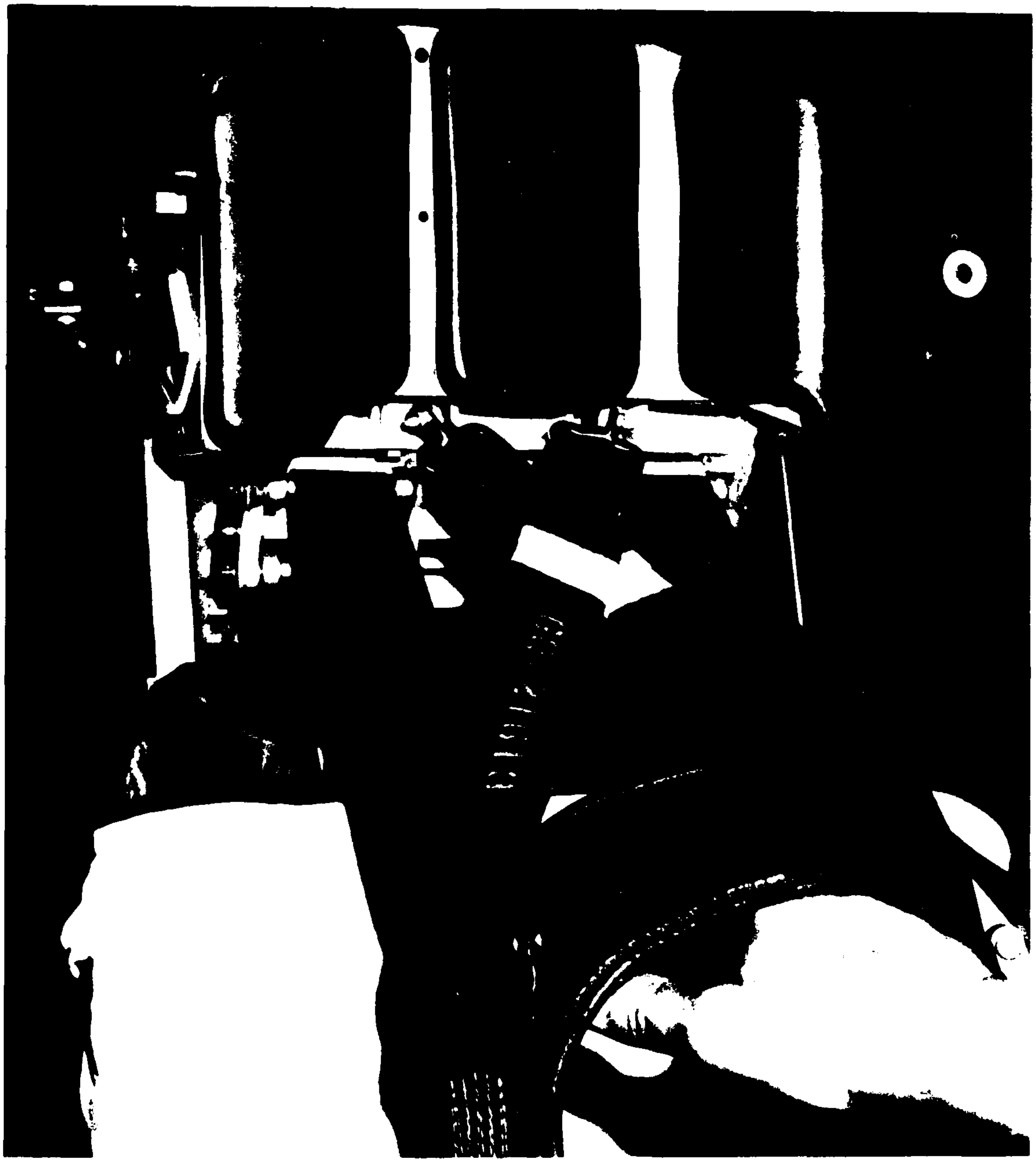


Figure 8. Proposed Crew Seat and Restraint System Modifications.

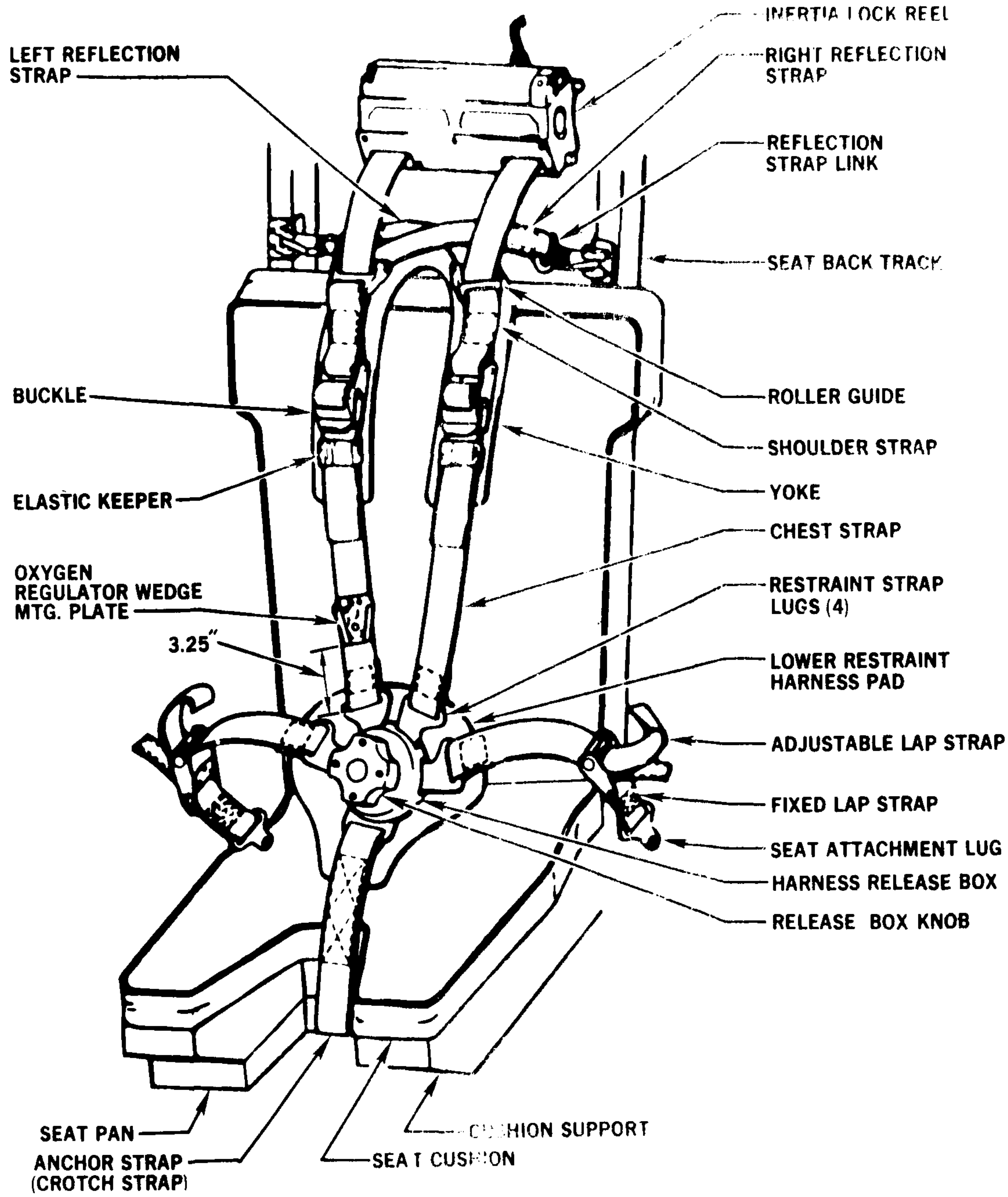


Figure 9. Operational Crew Seat and Restraint System.

in each shoulder strap) expected during operational use of the inertia reel. However, previous tests of similar restraints in England (Reader, 1967) and at Holloman AFB (Zaborowski, 1965) resulted in subject complaints when preloads of 50 lb or greater per strap were imposed. In view of these reports, and since imposition of static preloads on the subject was required for relatively long periods of time (approximately 15 minutes) prior to the impact event, imposition of preloads of such magnitude was neither practical nor desirable. In addition, previous experience at AFAMRL has shown that significant variations in restraint performance do not occur unless the pretension is well below 20 lb. Therefore, the aforementioned pretensions were deemed adequate.

C. DATA ACQUISITION SYSTEM

Electronic data collected during the test program included impact carriage acceleration and velocity, test fixture loads and acceleration, subject head and chest acceleration, harness loads, and single-lead electrocardiograms. Detailed descriptions of the instrumentation, electronic data processing equipment, mounting procedures, and calibration techniques are provided in Appendix A. The following information summarizes the electronic instrumentation that was used to acquire the test data.

Carriage acceleration was measured using three miniature, piezoresistive accelerometers mounted to the structure of the VDT carriage. Vertical velocity was determined at the point of impact, i.e., the point where the carriage plunger contacted the water in the deceleration cylinder.

The test fixture was instrumented to measure the forces reacted into the seat, restraint, and footrest by the subject. Triaxial acceleration was measured on the seat pan structure to quantify the impact exposure. The seat pan structure included three load cells and three load links to measure the vertical and horizontal forces reacted through the structure. Forces were measured in the restraint system using strain gages bonded to the seat attachment hardware or Lebow belt load cells. Leg forces were measured by three triaxial load cells which were incorporated within the rudder pedal support structure.

Triaxial accelerometer arrays were used to measure acceleration on the head and chest of each subject. The chest accelerometer package was held tightly against the subject's sternum by a Velcro chest strap. The subject's head accelerometers were mounted on a dental bite block, which was held in the subject's mouth during the test. This technique has proven to be not only a safe means of providing intraoral/dental protection during impact, but also an effective way of minimizing movement of the accelerometer package relative to the subject's head during impact.

The electronic data obtained from the transducers described above were encoded into pulse code modulation digital format and then transmitted by telemetry to a word formatter. The word formatter reformatted the serial data into parallel data which was transmitted to a PDP 11/34 computer for recording and processing.

Photometric data were collected using two high speed (500 frames per second), 16 mm Milliken cameras mounted on the impact carriage. One camera was mounted to the right of the subject perpendicular to the sagittal plane. The second camera was mounted above the footrest to provide a frontal view of the subject.

The movements of the subject's helmet, head, shoulders, arms, and the chest accelerometer package were quantified by tracking the motion of fiducials attached to these sites. The fiducials which were attached to the subject and to the test fixture consisted of a one-half inch diameter black circle printed on a one inch diameter white target. The locations of the fiducials generally followed the guidelines provided in "Film Analysis Guides for Dynamic Studies of Test Subjects, Recommended Practice" (SAE J138, March 1980). More complete descriptions of the fiducial locations as well as the photometric instrumentation system are provided in Appendices A and D. Timing reference marks were recorded on the 16 mm film once every 0.01 sec. These reference marks were synchronized with the electronic instrumentation recordings.

A video camera was also used to document the tests. This camera and accompanying recorder operate at 120 frames per second with an effective shutter speed of 10 microseconds or less. Use of this system allowed the investigators to evaluate the kinematic response of each subject immediately after each test. This system is described in Appendix A.

Photographs of the test subject and equipment configuration were taken prior to each test. Items of special interest were photographed as required.

D. TEST SUBJECTS

The test dummy used for this program was an Alderson Research Laboratories, Inc., model VIP-95 dummy (serial number 124), which was designed to represent a 95th percentile adult male. The dummy was originally built for $-G_x$ automotive crash testing, based on specifications furnished to Alderson by the National Highway Traffic Safety Administration. It was designed to reproduce the head-neck response of human cadavers in forward facing impacts, but was not designed to produce meaningful response dynamics in vertical impacts. This limitation was not a critical factor in the current study, since the dummy was used only to verify the structural integrity of the test apparatus prior to human testing. The dummy's joints were adjusted to a nominal one G value, in accordance with the U.S. Department of Transportation Federal Motor Vehicle Safety Standard No. 208.

All human volunteer subjects who participated in this test program were members of the AFAMRL Impact Acceleration Stress Panel. This panel is composed of volunteer active duty Air Force members whose primary duties do not involve participation as subjects. A total of 18 subjects were utilized during this test program. There were no special technical qualifications or training requirements for subjects. However, all subjects were qualified to participate only after successfully completing an intensive medical screening evaluation (Hearon & Raddin, 1981). This evaluation was directed by the panel physician and consisted of medical history screening, physical examination, visual acuity testing, audiometry, blood pressure measurement, routine laboratory examination (blood work and urinalysis), standard 12-lead electrocardiogram, pulmonary function tests, electroencephalogram, treadmill exercise stress test, and x-rays, including chest, skull, and complete spine films. The x-rays were reviewed by the panel physician in consultation with a radiologist (and orthopedic surgeon, as necessary) to assure elimination of individuals with disqualifying radiographic findings. Female subjects had a negative pregnancy test documented and underwent a pelvic exam by a gynecologist, to assure there were no

gynecologic contraindications to their participation. Relevant abnormalities in any part of the medical evaluation led to elimination of the candidate or specialty consultation and further examination, as required. Annual requalification of panel members was accomplished with a limited medical evaluation, including a physical examination and other relevant medical tests.

The generic human use protocol under which these impact tests were conducted was AFAMRL Protocol No. 80-01, "Generic Impact Acceleration Protocol, 1980". This document presented a survey of available human biodynamic test data, established broad generic exposure limits for human impact testing, and described the generic medical risks associated with such tests. Following review by the AFAMRL Human Use Review Committee (HURC) on 10 January 1980, this protocol was recommended for approval by higher authority. Subsequently, the protocol was approved by AFAMRL/CC and, as SGO R-80-001, it was approved by USAF/SG on 7 March 1980.

The specific human use protocol under which these impact tests were conducted was AFAMRL Protocol No. 80-37, "Evaluation of the Influence of Negative Shoulder Harness Angles in the Operational F/FB-111 Crew Seat and Restraint System During $+G_Z$ Impact Acceleration". This document summarized the operational F/FB-111 ejection data, the previous experience with human impact testing in the F/FB-111 harness, and the specific medical risks associated with the proposed human tests. The overall risk of injury to human subjects was judged to be acceptable when compared to minimizing F/FB-111 crewmember morbidity during emergency escape. This protocol also specified that subjects who had not previously participated in vertical impact tests in the F/FB-111 restraint harness would first be exposed at the orientation 8 G level prior to 10 G exposures. In addition, it was noted that the proposed orientation and test levels were well below accelerations experienced operationally. This human use protocol was reviewed and recommended for approval by the AFAMRL/HURC on 9 October 1980 and was subsequently approved by AFAMRL/CC.

The tests which comprise the C cell of the experimental matrix were conducted from 1 August to 3 September 1980 as part of another F/FB-111 test program (Brinkley et al., 1982). The specific human use protocol under which these tests were conducted was AFAMRL Protocol No. 80-23, "Evaluation of the F/FB-111 Crew Seat and Restraint System Headrest Position", which was reviewed and recommended for approval by AFAMRL/HURC on 26 June 1980 and which was subsequently approved by AFAMRL/CC. Protocols 80-23 and 80-37 were specific protocols submitted under the "Generic Impact Acceleration Protocol, 1980", Protocol 80-01, and as such required local consideration and approval only, in accordance with AFR 169-3, "Use of Human Subjects in Research Development, Test, and Evaluation" (February 1979).

Ongoing informed consent was provided by all subjects during the test program. Prior to testing, subjects received a thorough briefing on the experimental procedures and potential medical risks of participation. The subjects signed a witnessed consent form attesting to the fact that a detailed briefing was received and summarizing its content. Throughout the test program, the medical investigator continued to stress that any subject was free to withdraw at any time for any reason.

Anthropometric measurements of the subjects participating in this test program were made by Dr. Kenneth Kennedy, Mr. Charles Clauser, and Lt Col Maureen Lofberg of AFAMRL/HEG. Table 2 is a summary of selected anthropometric values for each subject. The mean and standard deviation computed from each set of dimensions compare favorably with the mean and standard deviation of the dimensions obtained from an anthropometric survey of USAF personnel conducted in 1967 and published in AFSC Design Handbook 2-2. Forty-nine anthropometric measurements were obtained from each subject. The mean, standard deviation, and range of selected group measurements are listed in Table 3. Weight is expressed in pounds and all other parameters are expressed in inches.

E. EXPERIMENT SEQUENCE

The controlled parameters during this program were the carriage drop height and the seat vertical adjustment. The relation between carriage drop height and resulting acceleration exposure had been well established during preceding test programs in which the same test fixture was utilized (Brinkley et al., 1981, 1982). The seat vertical adjustments for each subject were determined prior to the test program, as described in Section 2A of this report.

The specific parameters for each test were provided to the test conductor and other personnel at the beginning of each day of testing. The conduct of all human exposures was the responsibility of a qualified and experienced test conductor. The test conductor directed the activities of all other personnel in the test area in accordance with a detailed checklist.

The first test of each day was done with an anthropomorphic dummy using the equipment configuration and test level planned for the first human test of the day. If no abnormalities were detected, the test personnel proceeded with preparations for tests with volunteer subjects. High speed motion picture cameras were loaded and mounted on the test fixture. Seat vertical and footrest adjustments were made to obtain the appropriate seat configuration based upon the test plan and the anthropometry of the individual test subject. Video recording equipment was readied to permit immediate review of the test by the investigators. The accelerometer packages were then oriented in their respective reference planes and reference zero values were sampled using the data acquisition system.

Subject preparation was concurrent with preparation of the test fixture and instrumentation. Prior to every impact exposure, each subject provided a brief interval medical history and was physically examined. Emphasis was placed on neck or back symptoms, medications, abnormalities of recent sleep patterns, or recent overindulgence in food or alcoholic beverages. No subject was exposed with symptoms which may have obscured detection of test-related injury or which may have indicated predisposition to such injury.

All subjects wore orange, cut-off, long underwear to allow mounting of camera targets and instrumentation. Male subjects wore athletic supporters. The female subject wore a bathing suit. Each subject was instructed to void prior to entering the test area.

TABLE 2. INDIVIDUAL SUBJECT ANTHROPOMETRY SUMMARY

SUBJECT NUMBER	WEIGHT (lb)	STATURE (in)	SITTING HEIGHT (in)	MID-SHOULDER SITTING HEIGHT (in)
D-1	203	73.6	39.7	28.0
F-3	167	68.6	36.4	25.5
F-2	159	67.1	37.5	26.3
F-4	142	67.0	36.4	24.7
G-3	164	67.1	34.8	25.0
G-2	117	62.9	33.3	23.2
H-3	186	73.9	38.0	26.1
H-5	139	68.5	35.6	24.1
H-4	192	67.7	37.0	25.7
K-1	169	67.1	35.7	24.8
M-2	162	66.1	35.2	24.0
M-10	140	65.7	36.1	24.8
M-11	145	69.5	35.7	25.4
M-13	169	73.0	37.3	26.3
P-3	198	72.8	39.1	27.7
R-2	148	68.1	35.9	24.3
R-3	146	66.2	35.2	23.9
S-3	167	69.6	36.6	25.6
MEAN	162	68.6	36.4	25.3
STD DEV	22.7	3.02	1.52	1.26

TABLE 3. COLLECTIVE SUBJECT ANTHROPOMETRY SUMMARY

ANTHROPOMETRIC MEASUREMENT	MEAN	STD DEV	RANGE
Weight	161	22.7	117 - 203
Stature	68.6	3.02	62.9 - 73.9
Cervicale Height	58.7	2.84	54.4 - 63.8
Trochanteric Height	35.9	2.29	32.3 - 39.9
Tibiale Height	17.6	1.15	15.8 - 20.3
Chest Circumference	38.2	2.34	33.7 - 42.7
Waist Circumference	33.3	2.64	29.6 - 39.1
Buttock Circumference	36.0	8.27	35.0 - 42.4
Acromion-Radiale Length	12.2	2.87	11.7 - 14.4
Radiale-Stylion Length	9.4	2.89	8.5 - 11.3
Sitting Height	36.4	1.52	33.3 - 39.7
Mid-Shoulder Sitting Height	25.3	1.26	23.2 - 28.0
Buttock-Knee Length	23.8	1.24	21.9 - 26.3
Knee Height, Sitting	21.4	1.30	18.7 - 23.7
Head Length	7.3	1.78	7.2 - 8.2
Head Breadth	6.0	0.21	5.6 - 6.4
Head Circumference	22.4	0.64	21.5 - 23.6
Hip Breadth, Sitting	14.4	0.77	13.2 - 15.9

A disposable dental bite block (made of Optosil placed over a stainless steel frame) was molded for each subject prior to each impact test. An electrically-isolated accelerometer array was then mounted on the metal frame of the bite block. This metal frame was recently modified with a metal arm which extends from the mouth of the subject to permit the mounting of a photometric target (fiducial). This modification was implemented to permit more precise quantification of subject head displacement and to directly couple the electronic and photometric data obtained from a given impact event.

The medical instrumentation of each subject was standardized as follows. Three stick-on EKG electrodes were placed on the subject, one on the upper posterior aspect of each arm and a third on the right lateral chest, sixth intercostal space, mid-axillary line. The snap-on lead from each of these electrodes was plugged into a telemetry transmitter, which, in turn, was strapped to the left upper extremity of the subject. Continuous remote transmission of a single-lead EKG to a portable EKG machine located near the VDT was assured prior to each impact. Sitting and standing tracings were obtained immediately pre-impact (and post-impact) and a continuous tracing was obtained during test countdown and impact. Coincident with EKG recording, pretest (and post-test) sitting and standing blood pressure determinations were made for each subject by the medical technician using a sphygmomanometer. These pressures were recorded on the appropriate EKG tracing.

The subject was then fitted with the appropriate size (medium or large) USAF HGU-26P flight helmet. After mounting the test fixture platform, the subject was asked to exhale and the chest accelerometer array was secured against the chest with a Velcro strap. The subject was then seated in the proper, upright position and, the restraint harness fitted according to the procedure described in the F/FB-111 Technical Order. The inertia reel straps were pretensioned to 14 ± 5 lb and the lap belt straps were pretensioned to 20 ± 5 lb. Stick-on photometric targets were placed on the subject at pre-determined locations and the positions of these targets relative to one another and to targets mounted on the test fixture were measured. Finally, the inertia reel strap angles (relative to a reference horizontal) were measured.

The subject was instructed not to brace with his upper extremities prior to impact. He was instructed to simply rest his folded hands in his lap. However, tensing of the leg muscles by bracing the feet against the rudder pedals was permitted. The subject was also instructed to brace his helmeted head against the headrest, in an attempt to minimize the forward and downward displacement of his head during the impact.

The final pretest activity consisted of documentation of the test configuration by still photographs, measurement of subject blood pressure, evaluation of the electrocardiographic tracing by the medical monitor, and final safety checks of the test equipment and facility by the designated safety monitor. The test carriage was then elevated to an intermediate height while the water brake was filled with water. Finally, the carriage was raised to the specified drop height, the test area was cleared, a countdown was initiated, and the carriage was allowed to fall onto the water brake to produce the desired impact.

The subject was provided with a foot switch which was connected to the control system of the VDT in such a way that the carriage could not be released unless the switch was depressed. In this manner, the subject was required to

consciously provide his ongoing informed consent throughout the immediate pre-impact period (including the countdown) until carriage release, in order for the test to proceed. After carriage release, of course, it was no longer possible to abort the test.

A physician monitor, who was responsible for assuring subject safety during testing, was present for each test and reserved the right to cancel any test at any time for any reason. Such reasons may have included a recent history of neck or back strain, pretest pre-syncope, pretest arrhythmia, or any other condition of the subject, equipment, or procedure which was deemed by the monitor to place the subject at undue risk. The medical monitor was provided a finger-operated switch similar in function to the subject's switch. It had to be depressed prior to carriage release in order for the test to proceed. Agreement of both the subject and the medical monitor that the test should proceed was thus assured.

During testing, an ambulance crew was alerted and standing by within one-half mile of the test facility. In addition, emergency medical equipment was arranged in the test area for use by the physician monitor in the event of an emergency. This equipment included a defibrillator, oxygen equipment, intubation equipment, IV solutions and equipment, appropriate emergency drugs, backboard, harness cutters, and bandages.

Following the impact exposure, the subject was released from the harness. The physician monitor assured that the subject was uninjured. Post-test blood pressures and EKG (single-lead) were obtained and a brief post-test physical examination was accomplished. The subject was then provided with contacts to obtain later medical care as required or to ask questions relating to his participation. Impact exposures for each subject occurred no more frequently than once in any five-day period to allow time for detection of any occult injury.

Regarding the chronology of this test program, as previously indicated, all but one of the tests in cell C of the experimental matrix were conducted from 1 August to 3 September 1980, as part of another F/FB-111 test program (Brinkley et al., 1982). The remaining human tests were accomplished between 29 October and 25 November 1980. It was impractical to randomize the presentation of these tests due to the length of time required to change the harness configuration from operational to modified. Therefore, in general, the tests with the operational harness (cells G and J) were conducted first, followed by tests with the modified harness (cell H and one additional C cell test).

Two deviations from the original test plan are noteworthy. In test #471, an 8 G orientation exposure, the inertia reel straps were not rigged as planned, being directed to the operational anchor points rather than to the anchor points designated by the modification. This did not affect subject safety or data analysis, since the data obtained in this test was not utilized in any statistical comparisons. In test #457, the seat vertical adjustment was incorrect (one inch lower than planned). This deviation from the test plan also did not affect subject safety or data analysis. The exposure for that subject was repeated at the proper seat height later in the test program and the data from the latter test was utilized in data analysis.

Section 4

TEST RESULTS AND ANALYSIS

A. PRETEST MEASUREMENTS

The vertical seat adjustment and resulting inertia reel strap angles (measured by inclinometer) for each subject in the various test conditions are indicated in Table 4. The vertical seat height of the test fixture was adjustable in one inch increments only. Therefore, for some subjects in the J cell test condition (operational harness), there was minimal contact or impingement of the inertia reel straps on the lower aspect of the headrest, as shown in Figure 10. (Refer to Table 1 for experimental matrix cell designations.) Contact with the headrest of as much as one-half these straps was permitted. Greater impingement of the inertia reel straps on the headrest (such that the inertia reel strap angle was distorted) resulted in lowering the seat by one increment. When performed, this adjustment generally eliminated the contact between the inertia reel straps and headrest. Measurements made with ten of the subjects (D1, F2, H3, H4, K1, M2, M10, P3, R3, S3) in an F/FB-111 simulator indicated that the seat adjustments investigated experimentally would not have resulted in helmet-canopy contact operationally.

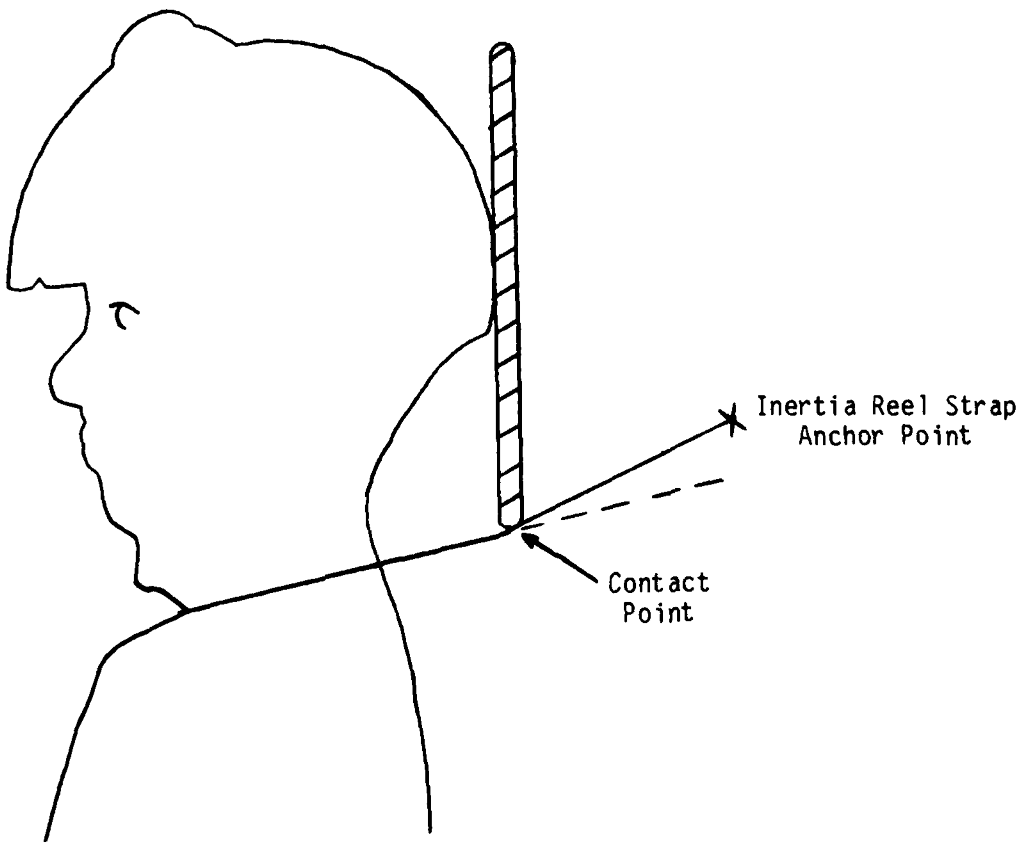


Figure 10. Contact of Inertia Reel Straps with Lower Aspect of Headrest.

Downward adjustment of the seat in the C cell test condition (modified harness) was limited by the requirement for adequate head support. Subjects with relatively small sitting heights were not tested in the full down seat configuration due to inadequate head support. For a given subject, adequate support was assumed to be present when the Frankfort plane intersected the headrest.

These limitations in the vertical seat adjustment (upward in the operational system and downward in the proposed, modified sytem) resulted in a relatively small change in seat height for some subjects from the lowest seat position (z_1) to the highest seat position (z_2). The average change in seat vertical adjustment was 1.82 inches. The largest change was three inches. Three subjects could be elevated only one inch from the "down" to the "up" test condition. Two subjects (D1 and P3), with relatively large sitting heights, could be exposed only in the full down seat position, since a seat elevation of as little as one inch resulted in significant impingement of inertia reel straps on the lower aspect of the headrest. These two subjects, therefore, could not be exposed to test conditions in the H and J cells of the experimental matrix. Also, due to the short duration of this test program and the occasional non-availability of subjects, it was not possible to expose all remaining subjects to all four test conditions. (See Table 4.)

Measured inertia reel strap angles as a function of harness type (operational or modified), vertical seat adjustment (in one inch increments), and seat back angle (90^o, 103^o, 110^o) are given for each subject in Appendix E. (Due to scheduling conflicts, subjects D1 and M2 were not measured in the modified harness.) The inertia reel strap angles of a subject have been found to be a function not only of harness type, seat configuration, and subject mid-shoulder sitting height, but also of subject body habitus and harness adjustment. It should also be noted that measuring inertia reel strap angles by means of an inclinometer is, at best, probably accurate to only $\pm 1^o$.

B. ELECTRONIC DATA

The electronically measured and computed data obtained during this test program are summarized in Table B-1 in Appendix B. Typical analog data sets from each cell of the experimental matrix and data summaries of each test at the experimental level are also presented in Appendix B.

A statistical analysis of the test results by the Wilcoxon paired-replicate rank test was performed. The means and standard deviations of each parameter in each comparison are summarized in Tables C-1 through C-6 in Appendix C. Statistically significant trends in the measured and computed response parameters for each comparison are summarized in Table 5. The arrow designates a statistically significant change in a parameter at the 90% confidence level for a two-tailed test. The arrow also indicates the direction of the trend from the cell smaller in magnitude. The number indicates the percentage increase in the parameter mean. Typical Wilcoxon computations from each comparison are also presented in Appendix C.

The potential operational significance of these experimentally determined trends should be noted. Among all non-fatal F/FB-111 ejections in a normally functioning crew module, 29.5% of the ejectees incurred vertebral compression fractures (Hearon _et al._, 1981). In addition to these crewmembers, others were

TABLE 4

MEASURED SEAT ELEVATIONS AND CORRESPONDING

INERTIA REEL STRAP ANGLES FOR EACH SUBJECT

	CELL OF MATRIX		
	C and G	C	G
SUBJECT	z_1	θ_C	θ_G
D 1	0	8	-4.5
F 3	0	17	6.5
F 2	0	19	9
F 4	0	*	9.5
G 3	2	12	0
G 2	2	18	7.5
H 3	0	*	4.75
H 5	1	*	8.5
H 4	0	*	5
K 1	0	15.5	6
M 2	2	15	5.5
M 10	0	21.5	7.5
M 11	1	14	3
M 13	0	13	-0.5
P 3	0	3.5	-4.25
R 2	0	18.5	8
R 3	2	14	2.5
S 3	1	12	2.25
MEANS	0.61	14.4	4.24
STD DEV	0.85	4.67	4.28
N =	18	14	18
RANGES	0 to 2	3.5 to 21.5	-4.25 to 9.5

z_1 indicates seat elevation (in inches from full down).

θ indicates the average inertia reel strap angle (in degrees) obtained by averaging measured left and right inertia reel strap angles.

* Subject was not tested in this cell of the matrix.

TABLE 4 (continued)

MEASURED SEAT ELEVATIONS AND CORRESPONDING

INERTIA REEL STRAP ANGLES FOR EACH SUBJECT

	CELL OF MATRIX		
CELL OF MATRIX	H and J	H	J
SUBJECT	z_2	θ_H	θ_J
D 1	†	†	†
F 3	3	3.5	-4.25
F 2	2	5	-1.75
F 4	3	6	*
G 3	3	8	-2.25
G 2	4	7.5	-0.5
H 3	2	6	-2.25
H 5	*	*	*
H 4	3	1.25	-4.5
K 1	1	10.5	1
M 2	4	3	-3.5
M 10	3	3.75	3.75
M 11	3	5	-2.25
M 13	1	8.5	0.5
P 3	†	†	†
R 2	2	9.5	3
R 3	4	2.75	-4.25
S 3	3	1	-4
MEANS	2.73	5.42	-1.52
STD DEV	0.96	2.93	2.71
N =	15	15	14
RANGES	1 to 4	1 to 10.5	-4.5 to 3.75

z_2 indicates seat elevation (in inches from full down).

θ indicates the average inertia reel strap angle (in degrees) obtained by averaging measured left and right inertia reel strap angles.

* Subject was not tested in this cell of the matrix.

† Subject could not be tested in this cell of the matrix due to his large sitting height.

TABLE 5

SUMMARY OF STATISTICALLY SIGNIFICANT TRENDS FROM THE WILCOXON COMPARISONS

AND PERCENT INCREASE IN PARAMETER MEANS

MATRIX CELL F-111 HARNESS SEAT POSITION	C Mod Down	G Oper Down	H Mod Up	J Oper Up	C Mod Down	J Oper Up
	(n = 14)		(n = 14)		(n = 12)	
CARRIAGE ACCELERATION						
CARRIAGE VELOCITY					--->	2
SEAT ACCELERATION						
CHEST ACCELERATION						
-X axis			--->	45		
+X axis	23 <---		39 <---		50 <---	
+Z axis	17 <---		8 <---		19 <---	
Resultant	17 <---		8 <---		20 <---	
CHEST SEVERITY INDEX			8 <---		12 <---	
HEAD ACCELERATION						
-X axis	46 <---		25 <---		47 <---	
+X axis			--->	29		
-Z axis	7 <---		4 <---		4 <---	
Resultant	6 <---		3 <---		4 <---	
HEAD SEVERITY INDEX						
STRAP LOADS						
Reflection Straps	56 <---		29 <---		75 <---	
Inertia Reel Straps	45 <---				28 <---	
Total Shoulder Straps	54 <---				48 <---	
Total Lap Belt					--->	13
Crotch Strap			50 <---			
SEAT PAN LOADS						
-X axis						
+Z axis					--->	4
Resultant					--->	4
FOOTREST LOADS						
-X axis					14 <---	
+Z axis			5 <---			
Resultant					5 <---	
SEE APPENDIX C	Table C-1		Table C-2		Table C-3	

TABLE 5 (continued)

SUMMARY OF STATISTICALLY SIGNIFICANT TRENDS FROM THE WILCOXON COMPARISONS

AND PERCENT INCREASE IN PARAMETER MEANS

MATRIX CELL	H	G	C	H	G	J
F-111 HARNESS	Mod	Oper	Mod	Mod	Oper	Oper
SEAT POSITION	Up	Down	Down	Up	Down	Up
	(n = 15)		(n = 12)		(n = 14)	
CARRIAGE ACCELERATION						
CARRIAGE VELOCITY				---> 1		
SEAT ACCELERATION						
CHEST ACCELERATION						
-X axis			34 <---			---> 28
+X axis					32 <---	
+Z axis	5 <---		11 <---			
Resultant	5 <---		11 <---			
CHEST SEVERITY INDEX	6 <---					
HEAD ACCELERATION						
-X axis	23 <---		17 <---			
+X axis						---> 34
-Z axis	4 <---					
Resultant	5 <---					---> 3
HEAD SEVERITY INDEX						---> 6
STRAP LOADS						
Reflection Straps	31 <---		26 <---			
Inertia Reel Straps	16 <---		31 <---			---> 25
Total Shoulder Straps	21 <---		31 <---			---> 15
Total Lap Belt	15 <---					---> 20
Crotch Strap	35 <---			---> 52		
SEAT PAN LOADS						
-X axis						
+Z axis	4 <---					---> 4
Resultant	4 <---					---> 3
FOOTREST LOADS						
-X axis		---> 13			19 <---	
+Z axis						
Resultant						
SEE APPENDIX C	Table C-4		Table C-5		Table C-6	

symptomatic, complaining of back pain following ejection. In view of these facts, it may be assumed that other ejectees narrowly averted vertebral fractures during emergency escape. Therefore, altering the current operational restraint in any manner which degrades impact protection may also increase the vertebral injury rate.

The impact test conditions were controlled by utilizing the same carriage plunger for all tests and by maintaining a constant drop height for all tests done at the experimental level. The means and standard deviations of carriage acceleration, seat acceleration, and carriage velocity change are indicated in Table B-1. During this test program, the peak carriage acceleration ranged from 10.2 G to 11.1 G and the peak seat acceleration ranged from 10.0 G to 11.5 G. The Wilcoxon analysis, as expected, revealed no statistically significant differences in these parameters from one test condition to another. (See Table 5.)

However, a similar analysis of the velocity change of the carriage at impact, which ranged from 24.3 ft/sec to 26.3 ft/sec, revealed a statistically significant difference between test conditions on two occasions (comparisons C-J and C-H), as shown in Table 5. Fortunately, these differences represented at most a 2% increase in velocity change and, in all cases, the direction of the increase was opposite to the directions of the trends of the other measured parameters. Therefore, the statistically significant increases in these parameters were observed in spite of the small but statistically significant decreases in carriage velocity. The changes in carriage velocity may be attributed to variations in rail friction on the VDT.

A direct comparison of the operational and the proposed, modified F/FB-111 harness was achieved by comparing the test results from cells C and G and cells H and J of the experimental matrix. In the C-G comparison, the harnesses are compared in the "down" seat adjustment. Resultant accelerations measured at the chest and the head were increased by 17% and 6%, respectively, in the modified harness. Both increases were due to statistically significant increases in both +X and +Z components of acceleration. Note that forward and downward rotation of the head during the impact event results in a portion of the +Z head acceleration being reflected as -X head acceleration. (See also Section 2B.) A statistically significant increase (54%) in total shoulder harness loads (as a result of increases in both inertia reel strap and reflection strap loads) was also demonstrated in the modified harness. The acceleration findings appear to indicate degraded impact protection performance in the modified harness.

In comparison H-J, the harnesses are compared in the "up" seat adjustment. There was an 8% increase in resultant chest acceleration and a 4% increase in resultant head acceleration in the modified harness. The increases were the result of statistically significant increases in the +X and +Z components of these accelerations, respectively. In addition, the chest Severity Index (SI) was increased in the modified harness and the component of chest acceleration in the -X direction (toward the seat back) was increased in the operational harness. These findings are all consistent with the interpretation of degraded impact protection in the modified harness. Although the reflection strap loads are again significantly higher (by 29%) in the modified harness, there is no significant change in inertia reel strap loads or in total shoulder harness loads. This may be related to artificial inflation of the inertia reel strap loads as a result of impingement of these straps on the lower aspect of the headrest for some subjects (6 of 14) in the J cell test condition.

The operational and modified harnesses were also compared along the diagonals of the experimental matrix, ie. comparisons C-J and H-G. (See Tables 1 and 5.) Since the "down" position compared to the "up" position for the modified harness has been previously shown to result in degraded vertical impact protection (Brinkley et al., 1981), and since the "up" position for the operational harness is associated with negative inertia reel strap angles which have been theorized to act in the genesis of vertebral fractures during emergency escape (Kazarian, 1977), the C and J cells of the matrix may provide relatively poor protection in the modified and operational harnesses. It follows that the test conditions in cells H and G may provide relatively better protection in the modified and operational harnesses. Thus, it is reasonable to pursue these comparisons.

In comparison C-J, the +X component, +Z component and resultant accelerations measured at the chest and the head are significantly increased in the modified harness. The computed chest SI is also significantly increased in the modified harness, as are all measured shoulder strap loads (inertia reel straps, reflection straps, and total shoulder strap loads). The acceleration findings are again consistent with the interpretation of degraded impact protection performance of the modified harness.

In addition, the resultant load reacted into the seat pan is significantly greater (4%) in the "up" position (operational harness) than in the "down" position (modified harness). This difference is due to the Z component of the load reacted into the seat pan. It is accompanied by a statistically significant increase in the resultant load reacted at the footrest (due primarily to the X component) in the modified harness. Since these findings were not observed in the previous comparisons of the modified and operational harnesses in which the seat vertical adjustment was held constant, these results may be attributed to the difference in vertical seat adjustment for the cells being compared. As the seat pan is lowered with respect to the fixed footrest, a smaller portion of the thigh is supported by the seat pan. Therefore, the inertial loading of the lower extremities was transferred from the seat pan (in cell J) to the footrest (in cell C). Similar findings related to vertical seat adjustment have been reported in the previous vertical test program of the modified harness (Brinkley et al., 1981).

Essentially the same findings in the C-J comparison are present in the H-G comparison. The +Z axis and resultant chest accelerations, the chest SI, and the -X axis, +Z axis, and resultant head accelerations are all significantly increased in the modified harness. Inertia reel strap, reflection strap, and total shoulder strap loads are all significantly increased in the modified harness. The acceleration findings again indicate degraded performance in the modified harness. Also, the vertical component and the resultant load reacted into the seat pan are significantly greater (3%) in the "up" position (modified harness) than in the "down" position (operational harness). These findings are accompanied by an increase in the X component of the load reacted at the footrest in the operational harness. The findings at the seat pan and footrest may be attributed to the difference in vertical seat adjustment, in the test conditions being compared, as described in the previous paragraph.

In all four comparisons of the operational and modified F/FB-111 harnesses, the resultant accelerations measured at the chest and head and the total loads carried in the reflection straps were significantly increased in the modified harness. The acceleration findings are indicative of degraded impact protection

performance in the modified harness and, furthermore, are independent of vertical seat adjustment. Similar trends would be expected in comparisons of test results obtained at intermediate vertical seat adjustments. Finally, these findings are not entirely unexpected, considering the large change in the restraint geometry in the proposed modification, as a result of relocating the reflection strap anchor points well aft and above the present locations of these anchor points on the seat back.

In comparison C-H, the modified harness in the "down" position is compared to the modified harness in the "up" position. The +Z component and the resultant chest acceleration, the -X component head acceleration, and the inertia reel strap, reflection strap, and total shoulder strap loads were all significantly increased in the "down" position. The acceleration findings are consistent with degraded impact protection performance of the proposed, modified harness as the vertical seat adjustment is lowered, thereby increasing the inertia reel strap angle.

These findings of the C-H comparison are at variance with the previously reported findings of similar vertical impact tests of the modified harness (Brinkley et al., 1981). In particular, the finding of increased Z component and resultant head acceleration at the lower seat adjustment in the previous study of the modified harness (the primary test result cited as being indicative of degraded vertical impact protection performance) was not demonstrated in the present study. On the other hand, an adverse change in chest acceleration was observed in this study, but was not demonstrated previously.

The variance in these two sets of experimental findings are apparently related to two important differences in the test conditions of the two studies. In the original evaluation, the range of vertical seat adjustment was, on the average, broader than the range in the present study. This is true because the "up" condition in the first test program was defined as the vertical seat adjustment at which a specific subject had a 0° inertia reel strap angle. The actual mean inertia reel strap angle for all subjects tested in that condition was $+2.59^{\circ}$. However, in this test program, the "up" condition for the modified harness was determined by the vertical seat adjustment in the operational harness (for the J cell). The actual mean inertia reel strap angle for all subjects tested in the comparable test condition in this study (H cell) was $+5.42^{\circ}$. The "down" test conditions were specified in the same manner in both studies. It is conceivable, therefore, that the broader range of vertical seat adjustment between the test conditions investigated in the previous test program may have contributed to the statistically significant increase in resultant head acceleration reported in that study.

It is also likely that the observed differences in test results may be attributed to the different upper extremity bracing techniques utilized by the subjects in the two test programs. During the original evaluation of the modified harness, in addition to bracing their helmeted heads against the headrest and their feet against the rudder pedals, the subjects were instructed to extend their upper extremities and to brace their hands against their anterior thighs or knees, as shown in Figure 11. The influence of this "hands-on-knees" bracing technique on human response during $+G_z$ impacts in the modified F/FB-111 harness and a standard USAF double shoulder strap lap belt configuration has been measured experimentally and has [illegible] by Brinkley et al (1982). In general, this bracing technique [illegible] eases chest

acceleration, increases loads reacted at the footrest, and decreases loads reacted at the seat pan, compared to a posture which precludes upper extremity bracing (eg., hands-in-lap). Findings similar to these were reported during the original vertical tests of the modified harness as the seat vertical adjustment was lowered from the "up" to the "down" position. In retrospect, these findings may be at least partially attributed to less effective upper extremity bracing in the lower seat position, and not solely based on the change in vertical seat height. This is true because lowering the seat pan may raise the knees of the subject relative to the seat pan, thereby making it more difficult for the subject to fully extend his arms and brace effectively. (See and compare Figures 11 and 12.)

In the present study, the influence of upper extremity bracing was eliminated by instructing the subjects to simply fold their hands in their laps, as shown in Figure 13. The findings in the C-H comparison reflect the absence of hands-on-knees bracing and are consistent with results expected for the hands-in-lap posture and observed in earlier comparisons. Finally, it is not clear why expected changes in seat pan and footrest loads with variation in vertical seat adjustment in the two test conditions are not observed. It may be that the relatively small vertical changes were not sufficient to demonstrate the trends.

The final comparison, G-J, concerns only the operational harness. Statistically significant increases are seen in resultant head acceleration and head Severity Index as the seat vertical adjustment is increased. (See Section 5A for analysis of this finding.) Again the inertia reel strap and total shoulder harness loads are increased in the J cell. However, this finding may be artifactual, since there was inertia reel strap impingement on the lower aspect of the headrest for some subjects in J. The Z component and resultant seat pan load were increased in the "up" condition, while the X component footrest load was increased in the "down" condition. These tandem findings, like those reported in the C-J and H-G comparisons, appear to be related to the amount of thigh support provided by the seat pan in each condition. There was no significant change in the reflection strap loads, which suggests that, as expected, the function of this strap is relatively unaffected by vertical seat adjustment.

The observed correlations are summarized in Table 5. Further discussion of test results and the implications of these results is presented in Section 5A.

Figure 11. Subject Bracing with Hands-on-Knees in the "Up" Seat Position.

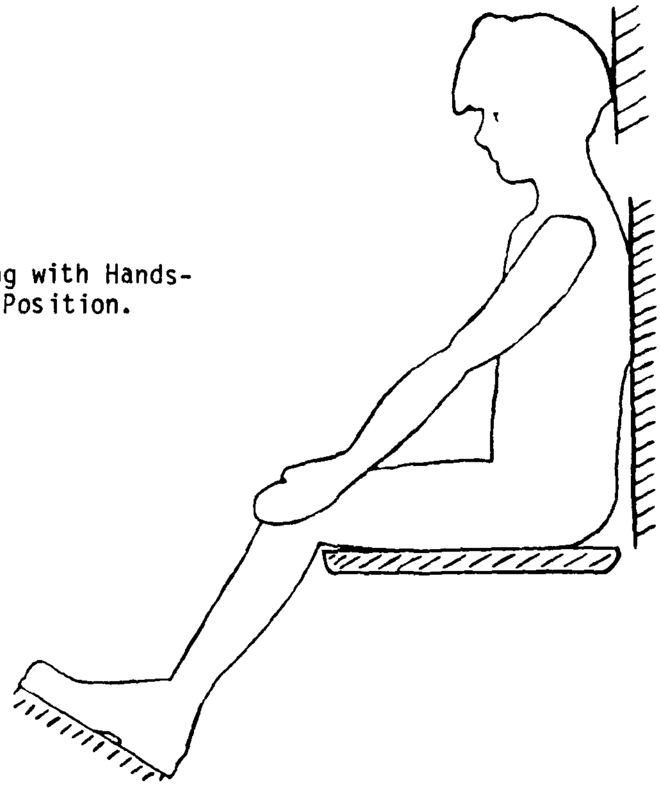
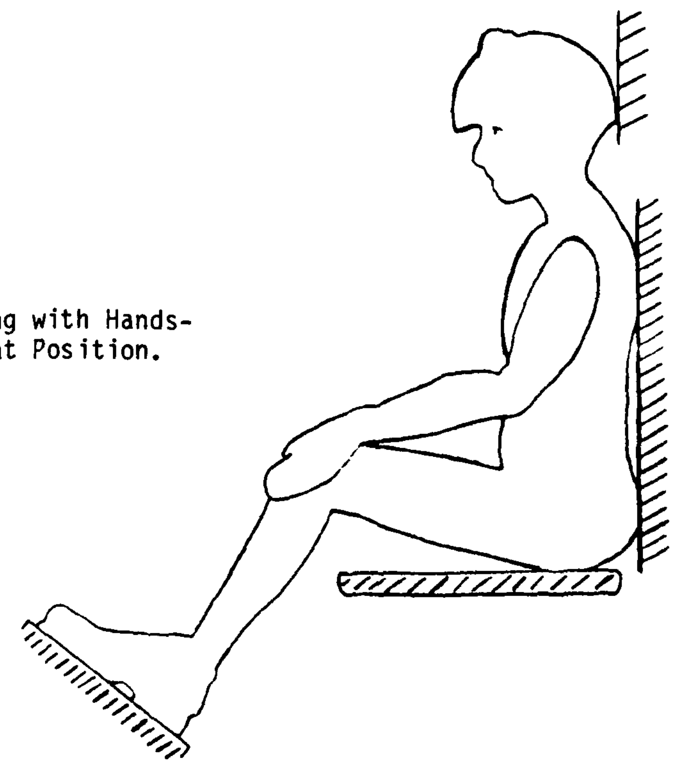


Figure 12. Subject Bracing with Hands-on-Knees in the "Down" Seat Position.



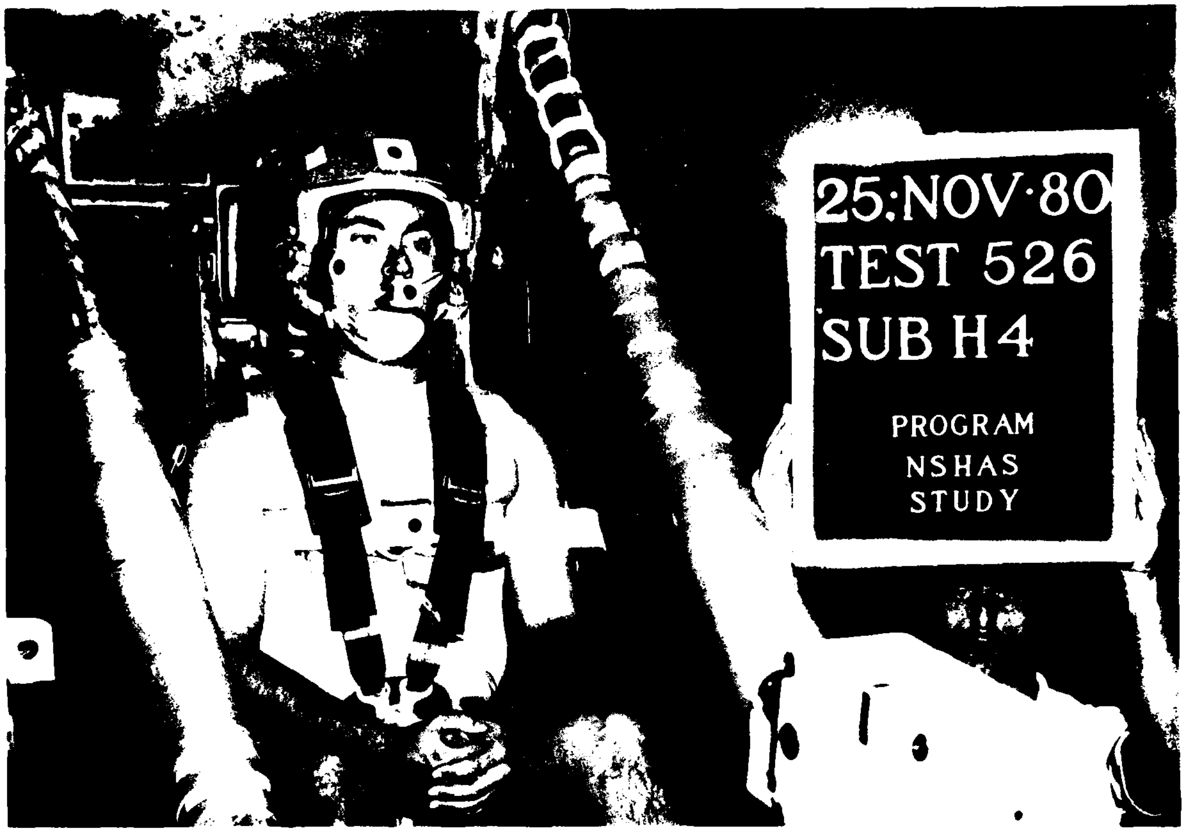


Figure 13. Hands-in-Lap Position.

C. PHOTOMETRIC DATA

The lateral photometric data obtained in this test series were processed to obtain the displacement-time, velocity-time, and acceleration-time histories of various photometric targets. In addition, the X-Z trajectories of these targets were analyzed. These data were utilized to (1) confirm the presence of subject head rotation during the impact, (2) demonstrate subject-specificity in the X-Z trajectories of the photometric targets, (3) verify subject headstrikes suggested by the electronic data, and (4) analyze the subject head motion associated with various head acceleration waveforms. (See also Section 4D.) Typical photometric data obtained in this test program are presented in Appendix D.

D. MEDICAL FINDINGS

The findings of 67 human impact tests are presented in this report. Thirteen of these exposures were at 10 G in the C cell of the experimental matrix and were originally conducted as part of another test program (Brinkley et al., 1982). Five of the tests were 8 G orientation exposures and the remaining tests were at the 10 G experimental level. Noteworthy medical findings were annotated immediately following each experiment by one of the two physicians who participated as medical monitors during this test program.

Three subjects reported transient paracervical pain during the impact, but no residual discomfort following the event. Two subjects incurred mild paracervical muscle strains, one requiring approximately 10 days to resolve. Another subject incurred a mild trapezius muscle strain. No contusions or abrasions were documented. The medical findings noted above were considered to be of no clinical consequence. Thus, the test conditions investigated in this program were considered to be well within human tolerance. No subject attrition was experienced during the testing.

Noteworthy is the observation that the X component of head acceleration was, in general, a characteristic waveform for each subject. This electronically measured parameter, of course, reflects both translational and rotational acceleration, as previously described (Section 2B). Nevertheless, analysis of the waveform patterns is instructive. Three basic patterns are apparent, as shown in Figure 14. The majority of subjects typically exhibited a biphasic waveform (positive acceleration followed by negative acceleration). Relatively few subjects exhibited either positive (primarily +X acceleration) or negative (primarily -X acceleration) waveform patterns.

The head motions associated with these waveforms may be appreciated by analysis of correlated photometric data. In Figures 15 and 16, the X and Z head displacement (measured at the subject's cheek) is plotted as a function of time for three subjects with typical waveforms. Initially, the X displacement increases (as the head moves forward) and the Z displacement decreases (as the head moves downward) at approximately the same rates in all three cases. However, each subject regains control of his head motion during the inertial response differently.

In the negative waveform case, the X and Z displacements are essentially held constant after the inflection points N and N', respectively. The subject, therefore, simply maintains a fixed head position after regaining control of his head motion. This pattern was observed in subjects who did not effectively brace their head against the headrest, those who simply forgot to brace, or those who "lost" their brace during descent of the test carriage.

In the biphasic case, the X displacement decreases and the Z displacement increases after the inflection points B and B', respectively. More effective contraction of the posterior paracervical muscles by this subject, as he regains control of his head motion, tends to return his head to its initial position. This pattern was observed in the majority of subjects, ie., those who were able to effectively brace their heads against the headrest.

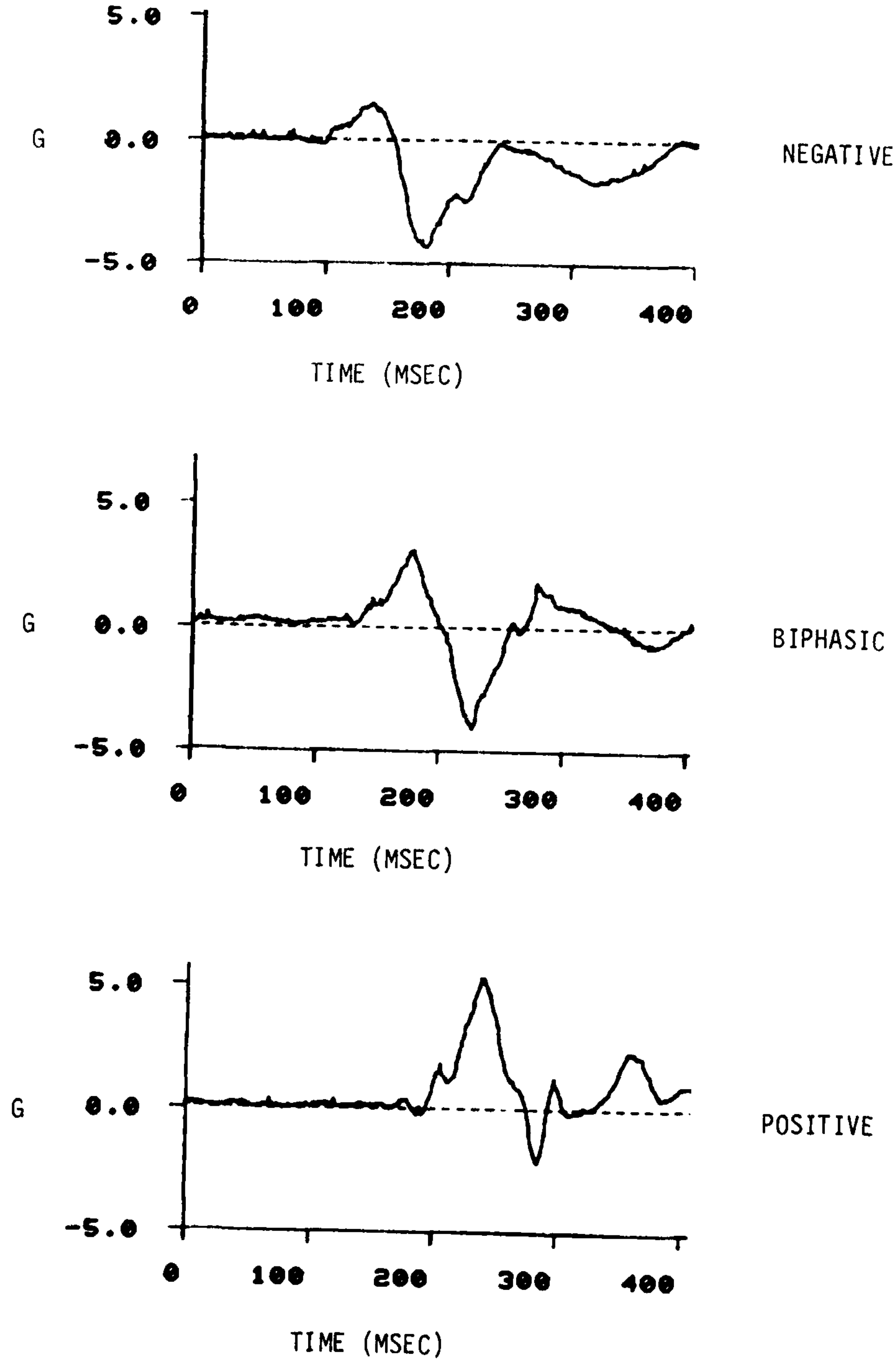


Figure 14. Head X Acceleration Waveforms.

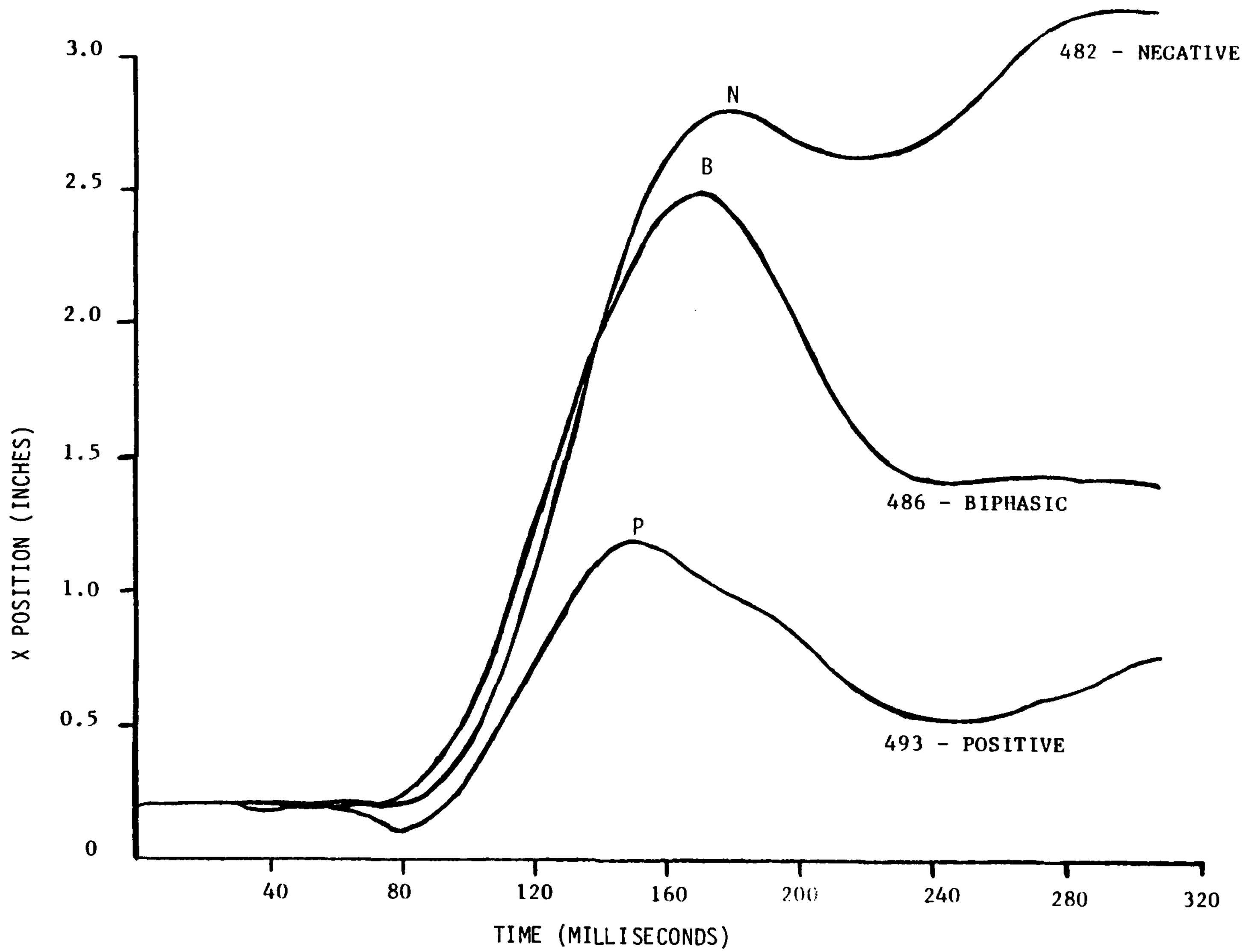


Fig. 15. Head X Position as a Function of Time for Three Subjects with Different Head Acceleration Waveforms.

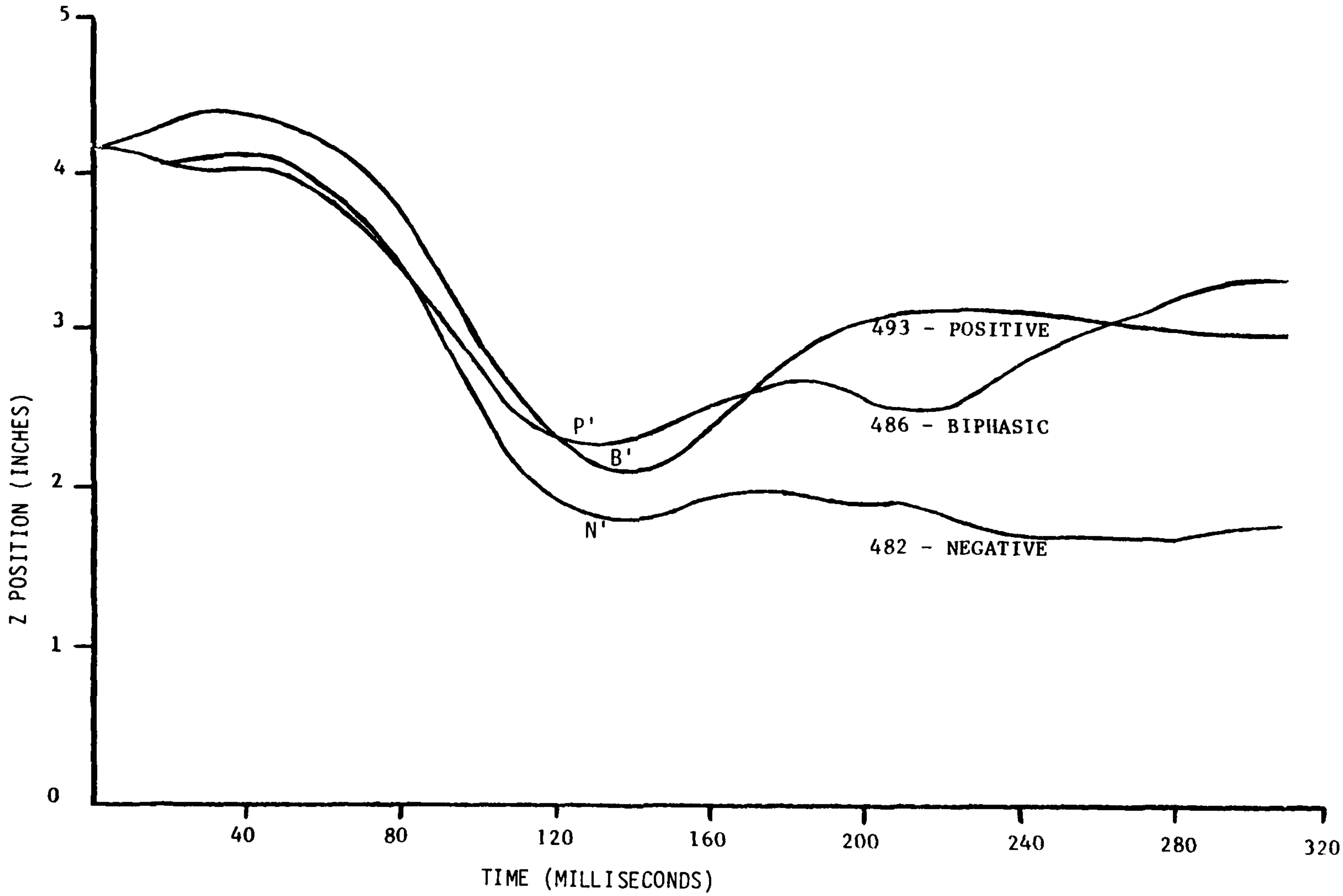


Fig. 16. Head Z Position as a Function of Time for Three Subjects with Different Head Acceleration Waveforms.

Finally, in the positive waveform case, the X displacement decreases and the Z displacement increases after the inflection points P and P', respectively. Very effective neck muscle contraction by this subject tends to return his head to its initial position earlier and more effectively than in the biphasic case. In fact, the photometric data from this particular test (#493) indicate that the subject's helmeted head was in contact with the headrest during the latter portion of the event. (Note the X-Z trajectory of the upper helmet fiducial shown in Figure 17.) The relatively small horizontal displacement of the head during this inertial response resulted in a hyperextension of the cervical spine and paracervical musculature. At this experimental impact level, the outcome was a muscle strain which resolved in approximately ten days. At operational impact levels, a more severe muscle strain under these circumstances would be likely. However, more serious cervical spine injury is considered to be unlikely, in view of the absence of such injury among survivors in the operational ejection experience (Hearon et al., 1981, 1982).

The frequency of occurrence of the three waveforms described above is indicated for each subject in Table 6. In most cases, a single pattern was characteristic for each subject. This may be a reflection of the biological variability among subjects and underscores the desirability of utilizing each subject as his own control when comparing inertial responses. Such biological variability is also demonstrated by characteristic or subject-specific X-Z trajectories of photometric targets mounted at various anatomic landmarks.

Headstrikes of the helmet on the headrest were observed during this test program. These were indicated electronically by positive spikes in the X component of head acceleration and were verified by correlation with the photometric data. The amplitudes of these spikes were relatively small, the largest being approximately 6 G. Subjects did not report being aware of significant helmet-headrest contact during impact. The frequency of these headstrikes is also indicated for each subject in Table 6. The tendency of some subjects to experience headstrikes is likely another evidence of biological variability or voluntary procedural variation among subjects.

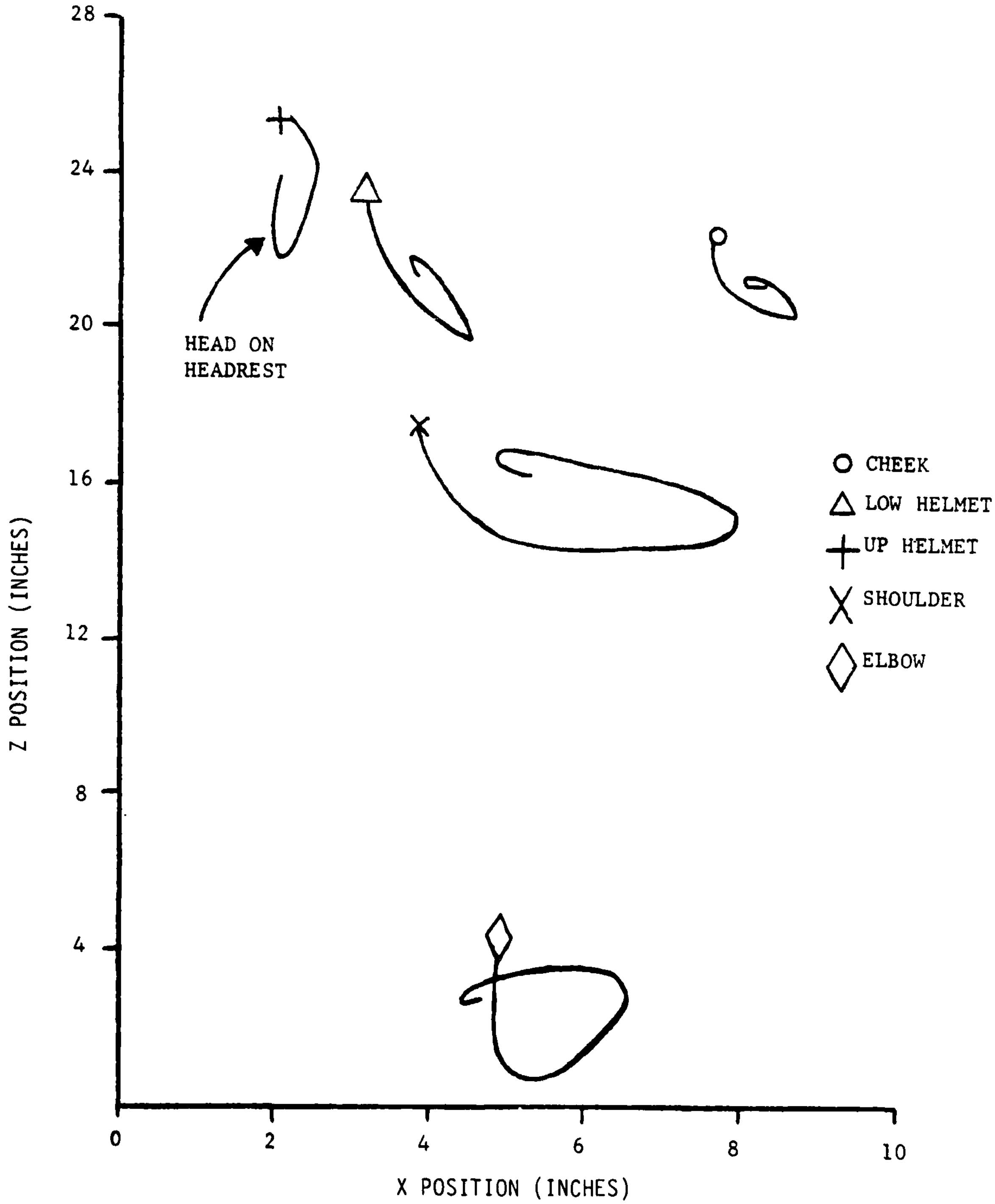


Figure 17. X-Z Trajectories of Photometric Targets in Test #493.

TABLE 6

HEAD X ACCELERATION WAVEFORMS AND

NUMBER OF HEADSTRIKES FOR EACH SUBJECT

SUBJECT	WAVEFORMS			TOTAL EXPOSURES	TOTAL HEADSTRIKES
	NEGATIVE	BIPHASIC	POSITIVE		
D-1	1	1	0	2	2
F-3	1	3	0	4	1
F-2	0	4	0	4	4
F-4	2	0	0	2	0
G-3	1	3	0	4	0
G-2	4	0	0	4	0
H-3	0	3	0	3	0
H-5	0	1	0	1	0
H-4	0	0	3	3	0
K-1	4	0	0	4	0
M-2	4	0	0	4	0
M-11	0	4	0	4	4
M-10	1	3	0	4	3
M-13	2	2	0	4	1
P-3	2	0	0	2	2
R-2	4	0	0	4	4
R-3	3	1	0	4	1
S-3	1	3	0	4	0

Section 5

DISCUSSION

A. IMPLICATIONS OF TEST RESULTS

The proposed modification to the F/FB-111 restraint system was based on an injury mechanism assessment which theorized that vertebral fractures among ejectees were the result of negative inertia reel strap angles in the operational harness (Kazarian, 1977). During powered inertia reel retraction in the presence of negative inertia reel strap angles, the direction of force application at the crewmember's shoulders is downward and medial. This unconventional shoulder strap geometry was theorized to be the primary etiologic factor in the vertebral fractures occurring during retraction (hyperextension injuries) and also was implicated as a contributing factor in the genesis of the landing impact fractures (hyperflexion injuries) as well. In fact, concern that negative inertia reel strap angles were causative in the operational back injuries was so great that no human volunteer subjects were exposed with negative angles in the initial impact tests of the modified harness (Brinkley et al., 1981). However, that concern was mitigated when the original contention was analyzed more carefully and when several plausible alternate injury mechanisms, unrelated to inertia reel strap angles, were identified during the initial testing. Finally, that concern was further mitigated by the findings of a more recent F/FB-111 vertebral injury analysis (Hearon et al., 1981, 1982). This human test program was justified from a medical risk standpoint on the basis of the results of this later analysis. (See Section 5B.)

Previous evaluation of the F/FB-111 harness by Dr. Kennedy of AFAMRL/HEG has revealed that the critical anthropometric dimensions which determine the inertia reel strap angle geometry for a given subject are sitting height and mid-shoulder sitting height. As a result of the pretest measurement of strap angles accomplished during this test program, this geometry also appears to be a function of a subject's individual body habitus and the manner in which the harness is adjusted. For example, in Table 7, two subjects matched for sitting height and mid-shoulder sitting height were found to have different inertia reel strap angles at the same seat elevation. The shoulder harness geometry is, of course, also a function of seat adjustment. The inertia reel strap angle increases as the seat is lowered and as the seat back is reclined. In Appendix E, this variation is documented for each subject in both the operational and modified harnesses.

TABLE 7

MEASURED INERTIA REEL STRAP ANGLES IN SUBJECTS WITH SIMILAR ANTHROPOMETRY

Subject ID	K-1	G-3
Sitting Height (cm)	90.6	88.5
Mid-Shoulder Height (cm)	63.0	63.5
Seat Vertical Position (in)	2	2
Right Inertia Reel Strap Angle (Degrees)	-3.5	+2.5
Left Inertia Reel Strap Angle (Degrees)	-3	+2

In the operational harness, upward vertical seat adjustment [illegible] the largest negative inertia reel strap angle for a given subject was limited by contact of these straps with the lower aspect of the headrest, as shown in Figure 4. Strap "contact" with the headrest was defined as minimal headrest contact with, at most, one-half of the inboard aspect of either or both inertia reel straps. Strap "impingement" was defined as significant headrest contact, such that the path of either or both inertia reel straps was grossly distorted. Strap contact in test condition J was allowed. Strap impingement, however, was not accepted and was eliminated by lowering the vertical seat adjustment one inch. Utilizing these acceptance criteria, the largest negative inertia reel strap angle (average of measured right and left strap angles) for any subject in test condition J, was found to be -4.5°. (See Table 4.) The largest negative angle (with strap contact) documented in the pretest measurements was -8° in the 90° seat back angle configuration and -12° in the 110° seat back angle configuration. (See Appendix E.)

The relatively small inertia reel strap loads (mean = 258 lb at -65°F and 13 inches retraction distance) which occur during inertia reel retraction (Whitney & Haas, 1970) appear to be insufficient to cause vertebral fracture, regardless of the inertia reel strap angle. This impression is supported by the AFAMRL experience with live human retractions using the Body Positioning and Restraint Device (BPRD). Subjects retracted from forward-leaning positions in 150 msec by forces up to 358 lb have indicated no untoward effects and, in fact, have generally reported the experience as benign (Raddin et al., 1979). Operationally, in the F/FB-111, for seat adjustments beyond the impingement point, significant frictional losses would be expected, resulting in slower, more benign retractions than those experienced without such impingement. Furthermore, higher seat positions would result in contact of the helmet with the canopy during flight, and would therefore not be used. It is problematic, therefore, that the presence of negative inertia reel strap angles causes vertebral injury during inertia reel retraction.

The human impact test series documented in this report was designed to assess the influence of negative inertia reel strap angles in the operational harness on inertial responses during $+G_z$ acceleration, such as that experienced during landing impact. The initial impact tests of the modified harness revealed changes in the performance of the harness with changes in vertical seat adjustment. Specifically, in the 90° seat back angle condition, the resultant head acceleration and the head Severity Index were increased with increasing inertia reel strap angles (ie., as the seat was lowered). These results naturally led to speculation regarding the outcome of a similar comparison of the operational harness. Statistically significant trends established by analysis of the electronic test results are revealing in this regard. (See Table 5.)

The pertinent comparison is G-J, the results of which have been described in Section 4B. The resultant head acceleration and head Severity Index were found to be significantly greater in the J condition (that associated with negative inertia reel strap angles in the operational harness). The chest acceleration data, however, indicated improved performance in the J condition, since the chest acceleration in the -X direction (into the seat) was significantly higher and the chest acceleration in the +X direction (away from the seat) was significantly lower in that cell than in the G condition. In this comparison, the evidence that negative inertia reel strap angles adversely influence inertial response during vertical impacts is conflicting. However, if a problem exists

here, it apparently cannot be rectified by the proposed modification since, in comparisons with the operational harness, the modification allowed both higher resultant head accelerations and higher +X (forward) chest accelerations for similar seat positions.

A final observation regarding shoulder harness geometry is noteworthy. The importance of the influence of inertia reel strap angles (as determined by vertical seat adjustment) relative to the type of F/FB-111 harness (operational or modified) utilized may be assessed by examination of the statistically significant trends in the six comparisons in Table 5. Comparisons C-G and H-J, in which the modified harness was directly compared to the operational harness at the same seat vertical adjustment, revealed statistically significant increases in resultant chest and head accelerations in the modified harness. On the other hand, comparisons C-H and G-J revealed that lowering the seat in either harness adversely affects measured chest acceleration. In general, then, these four comparisons indicated some evidence of degraded performance as the seat was lowered for either harness alone and for the modified harness compared to the operational harness at the same seat vertical adjustment.

Examination of the remaining two comparisons in Table 5 revealed, as expected, degraded performance when the modified harness in the "down" condition (C cell) was compared to the operational harness in the "up" condition (J cell). This was evidenced by statistically significant increases in both chest and head accelerations in the C cell. However, in the H-G comparison, when the modified harness in the "up" condition was compared to the operational harness in the "down" condition, the adverse trends in chest and head acceleration were correlated with the modified harness rather than the "down" vertical seat adjustment. Therefore, it appears that the adverse influence on performance due to the modified harness itself is more significant than the influence of vertical seat adjustment.

The statistically significant trends summarized in Table 5 consistently indicate degraded performance in the modified harness, as evidenced by increases in resultant chest and head accelerations and increases in the chest Severity Index. The relative magnitudes of these increases in the various comparisons are also shown. These indications that human inertial response in the modified harness is more severe than in the operational harness are disturbing, particularly in the face of the relatively high vertebral injury rate (29.5%) experienced operationally. When the injury rate associated with a mechanical force environment is high, a reasonably safe presumption is that subclinical vertebral injuries or near-injuries, in addition to those diagnosed vertebral fractures, are also occurring. The operational ejection data confirm that not all ejectees who experienced back pain as the result of emergency escape were found to have vertebral fractures (Hearon, 1981). Those crewmembers, who were diagnosed as having paravertebral muscle strains, in fact, may have narrowly averted a vertebral fracture. Any factor shown to degrade impact protection performance at the experimental level, therefore, may adversely influence the injury rate operationally by increasing the severity of the inertial response.

Despite the consistent trends observed in the resultant chest and head accelerations, the vertical and resultant loads reacted at the seat pan were not increased when the modified harness was compared to the operational at the same vertical seat adjustment. (See comparisons C-G and H-J.) This observation does

not mitigate the aforementioned acceleration findings, which indicate some level of degraded performance in the modified harness.

A final observation concerns the shoulder strap loading. In the modified harness, the anchor points of both inertia reel straps and reflection straps are relocated upward and the reflection strap anchor points are moved well medial and aft of their locations on the seat back in the operational harness. This results in a statistically significant increase in inertia reel strap and reflection strap loading in the modified harness. (See comparisons C-G, C-J, and H-G.) The operational reflection straps carry significantly less load because of the change in strap arrangements and load application points. However, they apparently provide more effective upper torso restraint in vertical impacts, as evidenced by the changes observed in chest and head accelerations. The importance of the operational reflection straps in providing lateral restraint during sideward impact has been previously documented (Brinkley et al., 1981).

B. FUTURE CONSIDERATIONS

This comparison of the operational and modified F/FB-111 harnesses was limited in that the assessment was confined to the vertical axis and four test conditions. The conditions selected for evaluation, however, as previously noted in Section 2A, were believed to be appropriate for several reasons. For example, the vertical axis was chosen for investigation because the Z component of resultant module acceleration on landing impact exceeds both X and Y components of acceleration (Brinkley et al., 1981) and because excessive vertical loading is now believed to be of considerable importance in the etiology of the vertebral fractures observed operationally (Hearon et al., 1982). Also, the 90° seat back angle condition was selected for evaluation because human response in the modified harness was shown to be more severe in that seat configuration than in reclined seat positions (Brinkley et al., 1981). The results of this limited test program, in addition to previous evidence of degraded lateral impact protection in the modified harness (Brinkley et al., 1981), provide the basis for our present recommendation not to pursue further comparative impact testing with the currently proposed modification and the operational harness.

On the basis of the foregoing test results and discussion, the currently proposed modification to the F/FB-111 crew seat and restraint system is not recommended for implementation. In the face of a restraint system which departs from standard design practice in several areas, as the F/FB-111 restraint does, it would be unlikely that the operational vertebral injury rate could be significantly improved by the simple expedient of partially eliminating negative inertia reel strap angles. Future proposals for modification of this restraint should thoroughly address mechanisms by which undesirable forces may be imposed on the crewmember. Numerous unconventional design features of the operational harness which may contribute to such adverse loading have been identified and discussed elsewhere (Brinkley et al., 1981). These include the shoulder harness yoke, the crossing reflection straps, the location of the headrest forward of the plane of the seat back, and the wide latitude for seat adjustment, including the independent motion of the seat with respect to the headrest.

For the present, it is recommended that a "buddy check" procedural change be adopted. Following harness and seat adjustment prior to take-off, each F/FB-111 crewmember should be instructed to verify that the inertia reel straps of the other crewmember are not in contact with the headrest. Downward seat adjustment is recommended if such contact is present, so long as adequate over-the-nose vision is maintained. In the event of ejection initiation in the presence of such contact, the resulting increased drag on the inertia reel straps could be sufficient to slow retraction, or in extreme cases, to stall the inertia reel and preclude retraction prior to ejection. This situation could thereby predispose an ejectee to a back injury during module separation or landing. Several crewmembers have, in fact, testified that they were not adequately retracted following initiation of the ejection sequence and, consequently, experienced forward flexion during module separation. Two of these crewmembers incurred vertebral fractures during retraction-ejection and a third may have incurred a vertebral fracture during this phase of the escape (Hearon et al., 1981; Hearon, 1981). Reasons for these apparent inertia reel failures were not delineated in the accident investigation reports. Further restriction of the range of seat adjustment for a specific anthropometrically-determined subset of flyers does not appear to be necessary, since there is no compelling evidence of performance degradation in the operational harness with negative inertia reel strap angles, as shown by the results of comparison G-J.

Any future modification to the F/FB-111 escape system for the purpose of reducing the vertebral injury rate should be based on a comprehensive aeromedical analysis of these injuries. Furthermore, design changes should be based on well established design practice or, if based on hypotheses, the changes should first be tested to verify the hypotheses. The importance of this approach cannot be overstated.

The findings of the most recent vertebral injury analysis (Hearon et al., 1981) are at variance with the earlier analysis (Kazarian, 1977; Kazarian et al., 1979). The salient differences between the vertebral injury analyses are shown in Table 8. The reasons for the marked disparity between the two assessments are described in more detail elsewhere (Hearon et al., 1982). It is apparent that the original review overestimated the magnitude of the vertebral injury problem and attributed a disproportionate number of vertebral fractures to the retraction phase of the escape sequence. Furthermore, the analysis attributed these retraction injuries to a presumed hyperextension injury mechanism and stated that negative inertia reel strap angles were the specific design feature of the operational harness responsible for this injury mechanism. Reassessment of the operational data, experience measuring inertia reel strap angles experimentally during this test program, and inertia reel retraction force data which showed relatively low force levels indicated that this contention was unlikely.

In addition, the re-examination of the operational ejection data revealed only two cases in which the F/FB-111 crew seat and restraint system itself was implicated as a cause or possible cause of a vertebral injury. One injury was incurred by a crewmember with a relatively large sitting height (37.75 inches) and was attributed to contact of his shoulders with the lower aspect of the headrest during retraction. The potential location of the plane of the headrest up to 2¼ inches forward of the plane of the seat back may have been a factor in the etiology of this particular injury. Another crewmember may have been injured by the so-called "horsecollar" mechanism, which involves an initial maladjustment of the restraint harness by the crewmember and which has been

described elsewhere (Brinkley et al., 1981). The unconventional design features of the restraint system to which these injuries have been attributed are not addressed by the proposed modification.

TABLE 8

COMPARISON OF F/FB-111 VERTEBRAL INJURY ANALYSES

	INITIAL ASSESSMENT (1977)	REASSESSMENT (1981)
OVERALL VERTEBRAL FRACTURE RATE AMONG SURVIVORS	40.3% (25 of 62)	31.3% (25 of 80)
RETRACTION-EJECTION VERTEBRAL FRACTURE RATE	29.0% (18 of 62)	11.3% (9 of 80)
MECHANISM RESPONSIBLE FOR MAJORITY OF FRACTURES	Hyperextension or combined hyperextension-hyperflexion	Axial compression-flexion
PHASE OF ESCAPE DURING WHICH MAJORITY OF FRACTURES OCCURRED	Retraction	Landing Impact
FRACTURES CORRELATED WITH NEGATIVE INERTIA REEL STRAP ANGLES	Yes	No

At least 11 of 23 injured crewmembers sustained vertebral fractures during landing impact of the crew module and several other crewmembers also may have been injured during this phase of the escape sequence. Crewmember testimony indicates that many of these ejectees were asymptomatic during the retraction-ejection and module descent phases of the escape and experienced the onset of back pain with landing impact. In addition, the spinal radiographic findings strongly implicate axial compression and hyperflexion (not hyperextension) as the primary causative mechanisms in these fractures (Hearon et al., 1981). The available evidence, therefore, indicates that the observed vertebral fractures in this population are frequently the result of excessive vertical loading during landing impact.

Over a decade ago, the severity of landing impact in the F/FB-111 crew module was recognized as a potential cause of crewmember vertebral injury. In fact, several concepts for modifying the crew module to achieve greater impact attenuation on module landing were considered (Johnson, 1968). However, none of these proposals were pursued.

To date, the operational ejection data indicate that the anticipated potential for injury on landing impact has been realized. Futhermore, it is likely that a significant reduction in the F/FB-111 spinal injury rate may be achieved only by decreasing the acceleration stresses imposed on the crewmember during landing impact (Brinkley et al., 1981; Hearon et al., 1981, 1982). A re-evaluation of the options available for improving impact attenuation on module landing should be pursued in future redesign considerations.

Finally, as an encapsulated escape system, the F/FB-111 aircraft provides the crewmember excellent protection against flail injuries due to windblast, even in the event of canopy loss from birdstrike. Such protection is becoming more important in view of increasing airspeeds at ejection. Windblast protection must continue to hold a high priority in the design of future escape systems and in the performance evaluation of current systems. In this regard, the absence of extremity flail injuries and the relative clinical benignity of the majority of F/FB-111 vertebral fractures should be carefully considered when comparing F/FB-111 performance to that of open ejection seat escape systems.

Section 6

SUMMARY

A. PROGRAM OBJECTIVES

This test program was designed to achieve the following objectives (Section 1B).

1. Establish the range of inertia reel strap angles for a population of volunteer subjects in the proposed modified and the operational F/FB-111 restraint harnesses as a function of seat adjustment.

2. Comparatively evaluate human inertial response in the modified and operational harnesses during vertical impact accelerations.

3. Obtain human impact data for use in the development of current and future mathematical models intended to predict human inertial response to impact.

B. TEST PROGRAM

1. A factorial experimental design was utilized to elucidate the effects of F/FB-111 harness type (modified or operational) and vertical seat adjustment (and, in turn, inertia reel strap angle) variation. The chosen test conditions investigated the 90^{o} seat back angle position at the extremes of vertical seat adjustment (Section 2A).

2. The Vertical Deceleration Tower (VDT) was utilized to provide nominal experimental $+G_z$ impacts of 10 G (26 ft/sec). (Section 3A).

3. The operational crew seat and restraint harness was salvaged from a F/FB-111 crew module. The proposed modification test item was provided by General Dynamics. Instrumentation was provided by AFAMRL (Sections 3B and 3C).

4. Human volunteer subjects were medically qualified and utilized in accordance with applicable human use regulations (Section 3D).

5. Relevant accelerations, forces, and loads were measured electronically. Appropriate physiological data were obtained. Subject motion was documented by high speed cameras (Sections 3C, 3D, and 3E).

6. A total of 54 human tests was conducted between 29 October and 25 November 1980. The results of 13 additional comparable human impact tests conducted during a previous test program (Brinkley et al., 1982) are also reported. (Sections 3D and 3E).

7. The Wilcoxon paired-replicate rank test was utilized in data analysis to establish the statistical significance of test results (Section 2B).

C. TEST RESULTS

1. All accelerations, forces, and loads measured at these impact levels in these test conditions were considered to be well within human tolerance (Section 4D).

2. Upward vertical seat adjustment in the operational harness was limited by contact of the inertia reel straps with the lower aspect of the headrest (Section 4A).

3. Measured inertia reel strap angles were found to be subject-specific. Measured inertia reel strap angles were not less than -12° in the static measurements taken over the entire range of seat adjustment and were not less than -4.5° (average) for the 90° seat back adjustment condition during any impact test (Section 4A).

4. Resultant head and chest accelerations were significantly greater in the modified harness than in the operational harness, regardless of seat vertical adjustment (and, in turn, inertia reel strap angles). (Section 4B).

5. There was no significant difference in seat pan loads when the modified harness was compared to the operational harness at the same seat elevation (Section 4B).

6. Resultant head acceleration in the operational harness increased with increasing seat vertical adjustment. However, resultant chest acceleration in the operational harness was independent of vertical seat adjustment (and, in turn, inertia reel strap angles). (Section 4B).

7. Evaluation of the modified harness at different seat elevations revealed statistically significant trends at variance with those reported in the initial test program (Brinkley *et al.*, 1981). However, performance was still found to be degraded at the lower seat elevation. The differences in test results are attributable to variations in test conditions (including subject bracing) between the two studies (Section 4B).

8. Biological variabilty among subjects was evidenced by characteristic (subject-specific) X component head acceleration waveforms (Section 4.D).

D. RECOMMENDATIONS

1. The current proposed modification to the F/FB-111 crew seat and restraint is not recommended for implementation. This recommendation is based on the degraded vertical impact protection performance of the modified harness compared to the operational harness documented in this study, the previous test program (Brinkley *et al.*, 1981), and the findings of the most recent (Hearon *et al.*, 1981) vertebral injury analysis (Sections 5A and 5B). (This recommendation has been accepted. The Engineering Change Proposal for the modified harness was cancelled at a Configuration Control Board in April 1981.)

2. Further human impact tests of the currently proposed modification are not recommended (Section 5B).

3. F/FB-111 crewmembers should be instructed to avoid vertical seat adjustments which produce contact of the inertia reel straps with the lower aspect of the headrest.

4. Future restraint harness modification proposals should consider all unconventional design features of the operational harness and should address all the mechanisms by which adverse loads may be imposed on the ejectee (Section 5B).

5. Future redesign efforts of the F/FB-111 escape system should be based on the findings of the most recent vertebral injury analysis (Hearon et al., 1981) and, therefore, should address landing impact attenuation as well as design variances in the crew seat (Section 5B).

APPENDIX A

DATA ACQUISITION EQUIPMENT AND METHODS

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INTRODUCTION

Under Contract F33615-79-C-0523, Dynalectron was requested by the Air Force Aerospace Medical Research Laboratory/Biomechanical Protection Branch to instrument a test fixture fabricated by General Dynamics Corporation and to collect impact test data in the comparative evaluation of the operational and proposed, modified F/FB-111 crew seat and restraint systems. The testing was conducted in one axis of acceleration on the Vertical Deceleration Tower Test Facility located at the Air Force Aerospace Medical Research Laboratory, Building 824, Area B, Wright-Patterson Air Force Base. The following is a discussion of the equipment and techniques used in acquiring and processing data that describes the kinematic and inertial responses of the human body. Installation and sensor specifications are also included in the discussion.

DATA MEASUREMENT DEVICES

This evaluation program was instrumented using thirty-seven transducers. The Digital Instrumentation Requirements sheets of Figures A-1 through A-3 contain the pertinent data for each channel.

SUBJECT INSTRUMENTATION

Each subject was instrumented with six accelerometers. These accelerometers were configured in groups of three to create two triaxial measuring packages. Each package was mounted to indicate accelerations in the X, Y and Z axes. Figure A-4 shows the coordinate system utilized and the corresponding output polarity for an applied acceleration.

The accelerometer package used to measure head accelerations was designed to be inserted into the subject's mouth. It consisted of three Endevco accelerometers, Model 2264-200, mounted to a plastic block with dimensions of 7/16 x 7/16 x 7/16 inches. This assembly was covered with a medical grade silicone rubber sealant to provide electrical isolation. The three accelerometer cables were routed to one end of the block. A dental bracket that had been custom fitted to the subject's mouth was mounted to the block. The approximate weight of the completed package was 50 grams. When the dummy subject was used the dental bracket was removed and the package was mounted to a bracket at the approximate center of the dummy's head. Specifications for the accelerometers used in this package are shown in Figure A-5.

The accelerometer package used to measure chest accelerations was designed to be attached externally to the subject's chest. It consisted of three Endevco accelerometers, Model 2264-150, mounted to an aluminum block that measured approximately 5/8 x 5/8 x 3/4 inches. This

assembly was inserted into an aluminum protection shield that was attached to a length of Velcro® fastener strap. In use, the completed package was placed over the subject's sternum while the Velcro® strap was wrapped around the subject and fastened. Specifications for the accelerometers used in this package are shown in Figure A-6.

HARNESS INSTRUMENTATION

Figure A-7 shows the test fixture, seat and restraint harness used during this evaluation program. This harness was used in two different configurations. Figure A-8 shows the modified configuration and Figure A-9 shows the operational configuration. Also, two different headrests were used, one for the modified and one for the operational harness.

A total of seven load cells were used to instrument the F-111 harness. Two of the transducers used were Lebow automotive belt load cells, Model 3419. These load cells monitored the load applied to the left and right inertia reel straps as shown in Figure A-10. Specifications for these load cells are shown in Figure A-11.

The five remaining load cells utilized the restraint harness hardware. Four 350 ohm resistive strain gages were bonded to each piece of harness hardware and wired in a bridge configuration. Figure A-12 shows the strain gage placement and wiring diagram. Figure A-10 shows the two reflection straps and Figure A-13 shows the lap and crotch strap units. The output polarity of each load cell corresponds to an applied load in accordance with the coordinate system shown in Figure A-14.

SEAT PAN INSTRUMENTATION

The seat pan instrumentation measured both acceleration and load. The acceleration measurements were performed using three Endevco accelerometers, Model 2264-200. The accelerometers were mounted to a plastic block, 3/4 x 1 x 1 inch, to form a triaxial package. This package

was secured to the seat pan assembly to indicate accelerations in the X, Y and Z axes as shown in Figure A-15. Figure A-4 shows the coordinate system utilized and the corresponding output polarity for an applied acceleration. Figure A-5 shows the specifications for the accelerometers used in this package.

The load measurements were made utilizing two types of load cells to fit the physical size limitations of the seat pan. Z-axis load measurements were taken using three Strainsert Flat Load Cells, Model FL2.5U-2SKPT. These cells were used in a three point mounting configuration as shown in Figure A-15. Specifications for these load cells are shown in Figure A-16. The X-axis and Y-axis loads were measured using load links specifically designed for this application by General Dynamics. These load links were instrumented with resistive strain gages as shown in Figure A-17. Each load link had four resistive arms with 2 arms active. Each end of the load links housed a swivel ball to eliminate cross-axis load effects on the measurements. The output polarity of each load cell corresponds to an applied load in accordance with the coordinate system shown in Figure A-14.

FOOT REST INSTRUMENTATION

The foot rest assembly, as shown in Figure A-18, was instrumented using three GSE load cells, Model T-10952C. These triaxial load cells were capable of measuring 2500 lbs. in the Z-axis and 500 lbs. in both the X and Y-axis. Figure A-19 illustrates the location and orientation of these load cells. The output polarity of each load cell corresponds to an applied load in accordance with the coordinate system shown in Figure A-14.

CARRIAGE INSTRUMENTATION

For acceleration measurements the carriage was instrumented with a triaxial accelerometer package. This package consisted of three accelerometers mounted to a 3/4 x 1 x 1 inch block. The accelerometers used were all Endevco transducers with the following Model numbers and axis measurements; 2262A-200 for Z-axis, 2264-200 for X-axis and 2264-150 for Y-axis.

Specifications for these accelerometers are shown in Figures A-20, A-5 and A-6 respectively. This package was securely mounted to the underside of the carriage. Figure A-4 shows the coordinate system utilized and the corresponding output polarity for an applied acceleration.

Carriage velocity measurements were obtained by means of a velocity wheel running against the rail. This unit consisted of a Globe Industries tachometer, Model 22A672, and a wheel mounted on its shaft. The wheel was aluminum with a rubber "0"-ring around the circumference. To insure continous rail contact the wheel assembly was spring loaded against the rail. The wheel was calibrated to output voltage as a function of velocity.

CALIBRATION

Strainsert Load Cells were calibrated on a periodic basis at the Precision Measurement Equipment Laboratories (PMEL), Wright-Patterson Air Force Base. The PMEL returns each device with a certificate providing current sensitivity and linearity data. Factory calibration data for the GSE Triaxial Load Cells were used for this evaluation program.

All accelerometers, load links, Lebow belt load cells and harness hardware load cells were calibrated at the AFAMRL/BBP Laboratory, Wright-Patterson Air Force Base. These calibrations were performed prior to (pre) and upon completion of (post) the evaluation program. This calibration data is shown in Figures A-21 and A-22.

Accelerometers were calibrated by using the reciprocity method to determine accelerometer frequency and phase characteristics as well as sensitivity. This method utilized a shaker table to which a "standard" accelerometer and the accelerometer to be calibrated were mounted. This "standard" accelerometer is calibrated yearly to standards traceable to the National Bureau of Standards. The sensitivity was determined by comparing the outputs of the standard and test accelerometer at 100Hz and 40G. The frequency and phase response was determined by driving the shaker table with a random noise generator and analyzing the output data by

Fourier Analysis via the PDP 11/15 and Time Data unit. The natural frequency and the dampening factor of the test accelerometer were both determined from this information.

The load cells mentioned previously in this section were all calibrated on a special test fixture. The sensitivity and linearity of each load cell was obtained by comparing its output with the output of a "standard" load cell output placed under an identical tension load. This "standard" load cell is calibrated on a yearly basis by standards traceable to the National Bureau of Standards.

SEAT GEOMETRY

The seat geometry drawings in Figure A-23 and A-24 show the polarity of the various output signals. Included in the drawings are the location dimensions for each fixed load cell and the variables introduced by the seat height and seat pan adjustment.

DIGITAL INSTRUMENTATION REQUIREMENTS

DYNALECTRON CORPORATION

PROGRAM Negative Shoulder Harness Angle Study DATE 28 Oct 80 THRU 25 Nov 80

FACILITY Vertical Deceleration Tower RUN 454 THRU 528

DATA CHANNEL	DATA POINT	XDUCER MFG & TYPE	S/N	XDUCER SENS	EXCITE V	CHAN	FILTER SERIES	S/N	AMP GAIN	S/N	SAMPLE RATE	FORMAT	F.S. SENS	FILTER HZ	XDUCER ZERO	RANGE	BRIDGE BALANCE RESISTORS	BRIDGE COMPLETION RESISTORS	SPECIAL NOTATIONS
1	Carriage Z	Endevco 2262A-200	FR42	4.161 mV/g	10.00	1	60	1	25	37	1K	1	24.03 g	120	2.50	+5.0 -0.0	-	-	
2	Head X	Endevco 2264-200	BP10	2.496 mV/g	10.00	2	60	2	50	21	1K	1	20.03 g	120	"	"	680K -into Gnd	1.65K	
3	Head Y	"	BQ42	2.713 mV/g	10.00	3	60	3	100	17	1K	1	9.21 g	120	"	"	114K -into 10V	"	
4	Head Z	"	BQ51	2.553 mV/g	10.00	4	60	4	25	10	1K	1	39.17 g	120	"	"	250K -into Gnd	"	
5	Chest X	Endevco 2264-150	BC26	2.786 mV/g	10.00	5	60	5	50	26	1K	1	17.95 g	120	"	"	1.2 M -into Gnd	"	
6	Chest Y	"	BB13	2.430 mV/g	10.00	6	60	6	100	5	1K	1	10.29 g	120	"	"	220K -into 10V	"	
7	Chest Z	"	2A20	2.619 mV/g	10.00	7	60	7	25	7	1K	1	38.18 g	120	"	"	155K -into Gnd	"	
8	Left Lap	Micro-Mea EA06-125 BZ 350	13	15.10 uV/lb	10.00	8	60	8	201	11	1K	1	824 lb	120	"	"	39.5K -into Gnd	-	
9	Right Lap	"	14	13.66 uV/lb	10.00	9	60	9	201	9	1K	1	911 lb	120	"	"	40 K -into Gnd	-	
10	N-G Strap	"	143377	1.80 uV/lb	10.00	10	60	10	800	10	1K	1	1736 lb	120	"	"	470 K -into Gnd	-	
11	Left Seat Pan	Strainsert FL2.5u 2SPKT	3294-3	8.040 uV/lb	10.00	11	60	11	201	7	1K	1	1547 lb	120	"	"	-	-	
12	Right Seat Pan	"	3294-4	7.988 uV/lb	10.00	12	60	12	201	10	1K	1	1557 lb	120	"	"	-	-	Use Tension Calibration Sensitivity
13	Center Seat Pan	"	3294-6	8.011 uV/lb	10.00	13	60	13	201	3	1K	1	1553 lb	120	"	"	-	-	
14	Left Reflection Strap	Micro-Mea EA-06-125 BZ 350	02-10	26.32 uV/lb	10.00	14	60	14	100	15	1K	1	950 lb	120	"	"	-	-	

Computer Comparator Start @ -3; Off @ +1
Modified Harness Tests: 470-478; 495-515; 521; 528

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Figure A-1 - Digital Instrumentation Requirements

DIGITAL INSTRUMENTATION REQUIREMENTS

DYNALECTRON CORPORATION

PROGRAM: Negative Shoulder Harness Angle Study DATE: 28 Oct 80 THRU: 25 Nov 80

FACILITY: Vertical Deceleration Tower RUN: 454 THRU: 528

DATA CHANNEL	DATA POINT	XDUCER MFG & TYPE	S/N	XDUCER SENS	EXCITE V	EXCITE CHAN	FILTER SERIES	FILTER S/N	AMP GAIN	AMP S/N	SAMPLE RATE	SAMPLE FORMAT	F.S. SENS 2.5 Volt	FILTER HZ	XDUCER ZERO	XDUCER RANGE	BRIDGE BALANCE RESISTORS	BRIDGE COMPLETION RESISTORS	SPECIAL NOTATIONS
15	Right Reflection Strap	Micro-Mea EA-06-125 BZ-350	01-3	34.04 uV/lb	10.00	15	60	15	100	21	1K	1	734 lb	120	2.50	+5.0 -0.0	20K into Gnd	-	
16	Left Inertia Peel Strap	Lebow 3419-3.5K	363	7.86 uV/lb	10.00	16	60	16	402	8	1K	1	791 lb	120	"	"	-	-	
17	Right Inertia Feel Strap	"	364	7.54 uV/lb	10.00	17	60	17	402	4	1K	1	825 lb	120	"	"	-	-	
18	Left Load Link X	Micro-Mea EA-06-062 TJ-350	001	10.79 uV/lb	10.00	18	60	18	402	11	1K	1	576 lb	120	"	"	106K into Gnd	-	
19	Right Load Link X	"	002	10.11 uV/lb	10.00	19	60	19	402	13	1K	1	615 lb	120	"	"	55 K into Gnd	-	
20	Left Foot Load X	GSE T-10952C	001	27.64 uV/lb	10.00	20	60	20	100	22	1K	1	904 lb	120	"	"	-	-	
21	Left Foot Load Y	"	001	28.61 uV/lb	10.00	21	60	21	100	24	1K	1	874 lb	120	"	"	-	-	
22	Left Foot Load Z	"	001	16.93 uV/lb	10.00	22	60	22	50	14	1K	1	2953 lb	120	"	"	-	-	
23	Right Foot Load X	"	002	28.36 uV/lb	10.00	23	60	23	100	6	1K	1	882 lb	120	"	"	-	-	
24	Right Foot Load Y	"	002	28.16 uV/lb	10.00	24	60	24	100	19	1K	1	888 lb	120	"	"	-	-	
25	Right Foot Load Z	"	002	16.61 uV/lb	10.00	25	60	25	50	19	1K	1	3010 lb	120	"	"	-	-	
26	Cen Foot Load X	"	003	27.94 uV/lb	10.00	26	60	26	100	25	1K	1	895 lb	120	"	"	-	-	
27	Cen Foot Load Y	"	003	28.08 uV/lb	10.00	27	60	27	100	16	1K	1	890 lb	120	"	"	-	-	
28	Cen Foot Load Z	"	003	16.50 uV/lb	10.00	28	60	28	50	16	1K	1	3030 lb	120	"	"	-	-	

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Figure A-2 - Digital Instrumentation Requirements

DIGITAL INSTRUMENTATION REQUIREMENTS

DYNALECTRON CORPORATION

PROGRAM Negative Shoulder Harness Angle Study DATE 28 Oct 80 THRU 25 Nov 80

FACILITY Vertical Deceleration Tower RUN 454 THRU 528

DATA CHANNEL	DATA POINT	XDUCER MFG & TYPE	S/N	XDUCER SENS	EXCITE V	EXCITE CHAN	FILTER SERIES	FILTER S/N	AMP GAIN	AMP S/N	SAMPLE RATE	SAMPLE FORMAT	F.S. SENS	FILTER HZ	XDUCER ZERO	XDUCER RANGE	BRIDGE BALANCE RESISTORS	BRIDGE COMPLETION RESISTORS	SPECIAL NOTATIONS
29	Velocity	Globe 22A672	3	.5019 vlts/fps	-	29	60	29	1	-	1	1K	62.2 FPS	120	5.00	+5.0 -0.0	-	-	Signal Attenuated by 6.242. Prior to Signal Conditioner Ampl. Neg. Output Sens.=.5019/6.242=.0804V/FPS
31	Carriage Y	Endevco 2264-150	BB11	2.354 mV/g	10.00	31	60	31	50	3	1	1K	21.24g	120	2.50	"	1M -into GND	1.65K	
32	Seat X	Endevco 2264-200	BV63	2.564 mV/g	10.00	32	60	32	50	27	1	1K	19.50g	120	"	"	397K -into Gnd	1.47K	
33	Seat Y	"	BV41	3.298 mV/g	10.00	33	60	33	50	5	1	1K	16.16g	120	"	"	125K -into Gnd	1.47K	
34	Seat Z	"	BN63	2.825 mV/g	10.00	34	60	34	50	32	1	1K	17.70g	120	"	"	512K -into Gnd	1.63K	
35	Cen Load Link Y	Micro-Mes EA-06-C62-TJ-350	004	10.23 uV/lb	10.00	35	60	35	402	5	1	1K	608 lb	120	"	"	82K -into Gnd	-	
36	Carriage X	Endevco 2264-200	BX49	2.581 mV/g	10.00	36	60	36	50	28	1	1K	19.37g	120	"	"	127K -into Gnd	1.47K	
47	2.5 Volt Bias		-	-	"	47	180	"	1	-	1	1K	2.5 Volt	360	"	"	-	-	
48	10 Volt Exc.		-	"	"	48	180	"	1	-	1	1K	5 Volt	360	0.0	"	-	-	

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Figure A-3 - Digital Instrumentation Requirements

ACCELEROMETER COORDINATE SYSTEM

ACCELERATION

Accelerometers will be oriented and wired to provide an output corresponding to the applied acceleration. Use this table as a reference:

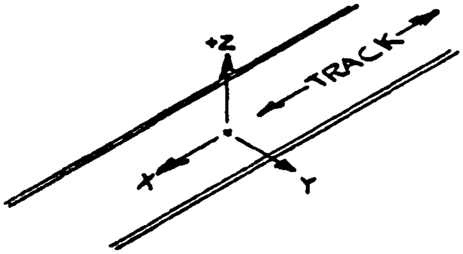
Acceleration	Output
+Gx	Positive
-Gx	Negative
+Gy	Positive
-Gy	Negative
+Gz	Positive
-Gz	Negative

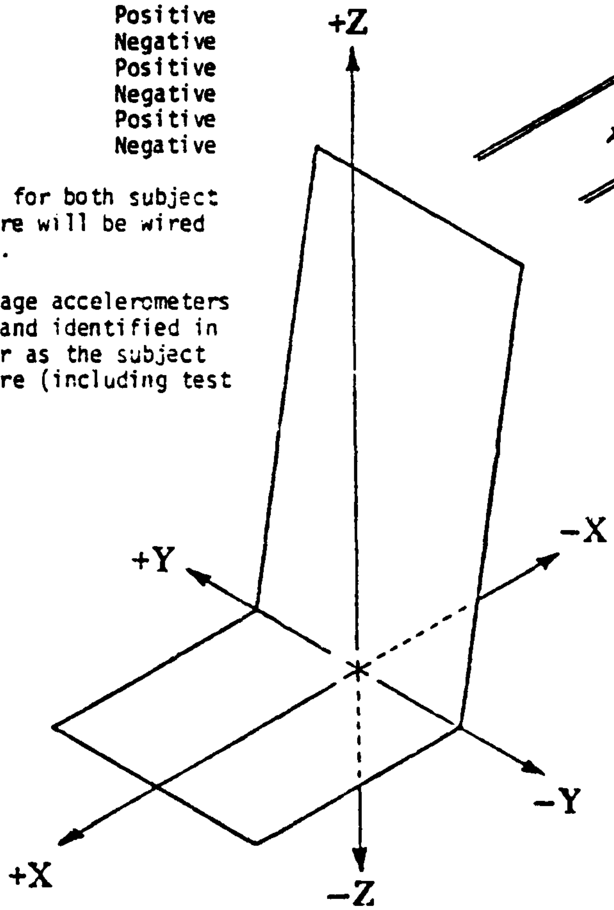
Accelerometers for both subject and test fixture will be wired in this manner.

Sled and carriage accelerometers will be wired and identified in the same manner as the subject and test fixture (including test profiles).

BARE SLED AND MACHINE TESTS

Accelerometers will be oriented to provide outputs to agree with track coordinate system with polarities as noted in test log.





AMRL BBP COORDINATE SYSTEM

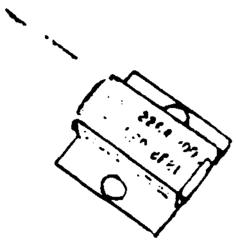
(Left Hand Rule)

Figure A-4

MODEL 2264-200

±200 g
One gram

MINIATURE PIEZORESISTIVE ACCELEROMETER



The Model 2264-200 is a very low mass, piezoresistive accelerometer designed for modal studies, flutter testing and similar applications requiring good low frequency response and minimum mass loading.

With only a small amount of damping, the Model 2264-200 has no phase shift over its useful frequency range of steady state to 1200 Hz. Protection against overranging results from the high environmental rating of ±1000 g peak. The accelerometer can be operated over a temperature range of 0°F to 150°F (−18°C to 66°C).

The 2264-200 utilizes Piezite* Element Type P-11 gages in a half bridge circuit providing a low impedance nominal output of 500 mV full scale at 10 Volts dc excitation.

SPECIFICATIONS FOR MODEL 2264-200 ACCELEROMETER

DYNAMIC

RANGE	−200 g to +200 g
SENSITIVITY (at rated excitation)[1]	2.5 mV/g, nominal; 2.0 mV/g, minimum
MOUNTED RESONANCE FREQUENCY	4700 Hz, nominal
AMPLIFICATION FACTOR, Q	10, maximum, at resonance and 75°F
FREQUENCY RESPONSE (reference 100 Hz)	±10% max., 0 to 1200 Hz at +75°F (24°C)
TRANSVERSE SENSITIVITY	3% maximum
LINEARITY AND HYSTERESIS[1]	±2% of reading maximum, 0 to 150 g; ±2.5% of reading maximum, 0 to 200 g
THERMAL SENSITIVITY SHIFT	±40 mV max., at 0°F and 150°F (−18°C and 66°C), ref. 75°F (24°C)
WARMUP TIME	1 minute

ELECTRICAL

EXCITATION[3]	10.0 V dc
RESISTANCE PER ARM[4]	1700Ω ±20%, at +75°F (24°C)
ZERO MEASURAND OUTPUT	±50 mV dc max., at +75°F
THERMAL ZERO SHIFT	±40 mV max., at 0°F and 150°F (−18°C and 66°C)
INSULATION RESISTANCE[5]	10M Ω minimum at 100 V dc

NOTES

[1]Measured with steady state acceleration.

[2]In shock measurements, minimum pulse duration for half sine or triangular pulses should exceed 1.5 milliseconds to avoid [illegible] quency ringing. (See Endevco Piezoresistive Accelerometer Manual.)

[3]Unit is calibrated at 10.0 V dc. [illegible] voltages may be used but should be [illegible] time of order. Use [illegible] Power Supply, or Model 4470 Signal Conditioner as excitation source.

[4]Due to self heating of the piezoresistive elements, the measured resistance is sensitive to the applied voltage.

[5]Measured between all leads tied together and shield or case.

ENVIRONMENTAL

ACCELERATION LIMIT[2] (in any direction)	Static:	±1000 g.
	Sinusoidal:	±1000 g pk.
	Shock:	±1000 g pk, 1.5 millisecond duration or longer. CAUTION: Keep protective sleeve on accelerometer until ready to use.
TEMPERATURE	Operating:	0°F to 150°F (−18°C to 66°C)
	Non-Operating:	−65°F to 200°F (−54°C to 93°C)
HUMIDITY		Epoxy Sealed
ALTITUDE		Not Affected

Figure A-5 - Accelerometer Specifications

MODEL 2264-150

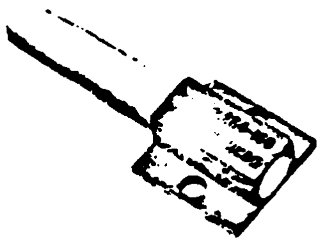
±150 g
One gram

MINIATURE PIEZORESISTIVE ACCELEROMETER

The Model 2264-150 is a very low mass, piezoresistive accelerometer designed for modal studies, flutter testing and similar applications requiring good low frequency response and minimum mass loading.

With only a small amount of damping, the Model 2264-150 has no phase shift over its useful frequency range of steady state to 1200 Hz. Protection against overranging results from the high environmental rating of ±1000 g peak. The accelerometer can be operated over a temperature range of 0°F to +150°F.

The 2264-150 utilizes *Piezite*® Element Type P-11 gages in a half bridge circuit providing a low impedance nominal output of 375 mV full scale at 10 Volts dc excitation.



TWO TIMES ACTUAL SIZE

SPECIFICATIONS FOR MODEL 2264-150 ACCELEROMETER
(According to ANSI and ISA Standards)

DYNAMIC

RANGE	−200 g to +200 g
SENSITIVITY (at rated excitation)[1]	2.5 mV/g, nominal; 2.0 mV/g, minimum
MOUNTED RESONANCE FREQUENCY	4700 Hz, nominal
AMPLIFICATION FACTOR, Q	10, maximum, at resonance and 75°F
FREQUENCY RESPONSE[2] (reference 100 Hz)	±10% max., 0 to 1200 Hz at +75°F (24°C)
TRANSVERSE SENSITIVITY	3% maximum
LINEARITY[1]	±2% of reading, maximum, 0 to 150 g; ±2.5% of reading, maximum, 0 to 200 g.
THERMAL SENSITIVITY SHIFT	±10% max., at 0°F and +150°F, ref. +75°F
WARMUP TIME	1 minute

ELECTRICAL

EXCITATION[3]	10.0 V dc
RESISTANCE PER ARM[4]	1700Ω ±20%, at +75°F (24°C)
ZERO MEASURAND OUTPUT	±50 mV dc max., at +75°F
THERMAL ZERO SHIFT	±50 mV max., over rated temperature range
INSULATION RESISTANCE[5]	10M Ω minimum at 100 V dc

NOTES

[1]Measured with steady state acceleration.

[2]In shock measurements, minimum pulse duration for half sine or triangular pulses should exceed 1.0 millisecond to avoid excessive high frequency ringing. (See Endevco Piezoresistive Accelerometer Manual.)

[3]Unit is calibrated at 10.0 V dc. Lower excitation voltages may be used but should be specified at time of order. Use ENDEVCO® Model 4203 Power Supply, 8830 Bridgesec, or Model 4470 Signal Conditioning as excitation source.

[4]Due to self heating of the piezoresistive elements, the measured resistance is sensitive to the applied voltage.

[5]Measured between all leads tied together and shield or case.

ENVIRONMENTAL

ACCELERATION LIMIT[2]		±1000 g pk shock pulse, one millisecond duration or longer. CAUTION: Keep protective sleeve on accelerometer until ready to use.
TEMPERATURE	Operating:	0°F to 150°F (−18°C to 66°C)
	Non-Operating:	−65°F to 200°F (−54°C to 93°C)
HUMIDITY		Epoxy Sealed

Figure A-6 - Accelerometer Specifications

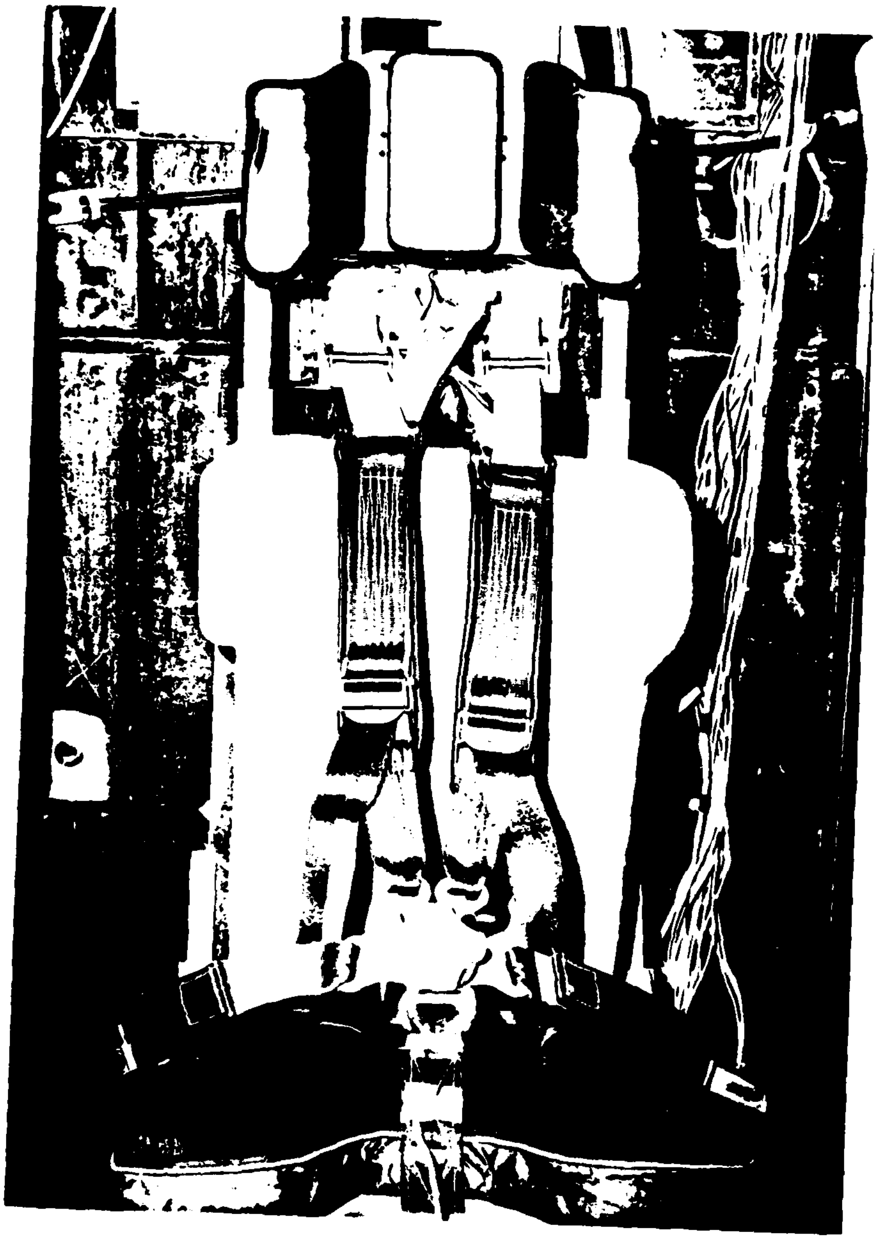


Figure A-7 - HARNESS ASSEMBLY

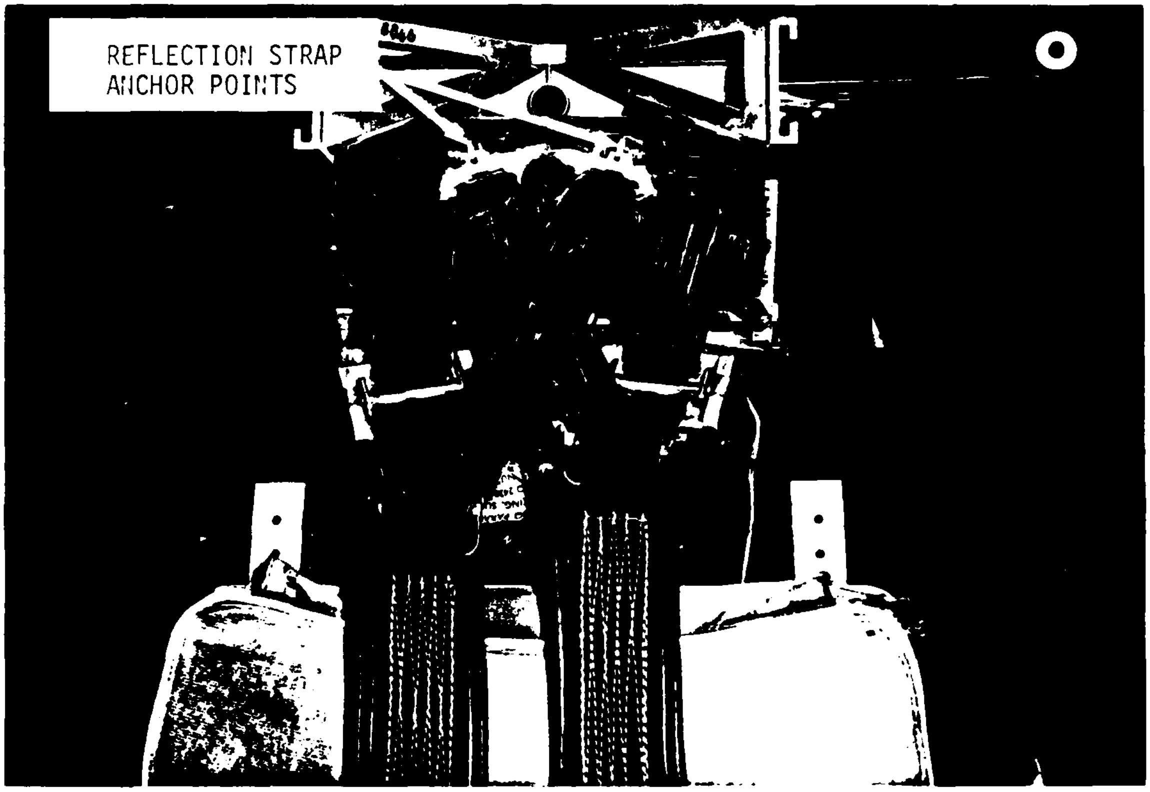
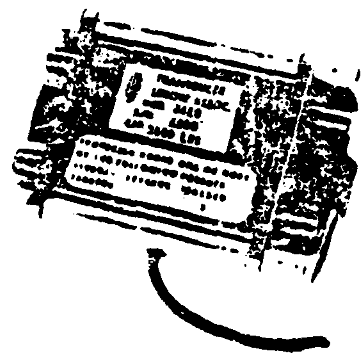


Figure A-8 - HARNESS CONFIGURATION (MODIFIED)

Figure A-9 - HARNESS CONFIGURATION (OPERATIONAL)

Figure A-10 - HARNESS INSTRUMENTATION

AUTOMOTIVE LOAD CELLS



Model 3419
Capacity Available
3500 lbs.

SPECIFICATIONS

Output at rated capacity: millivolts per volt, nominal	± 2
Nonlinearity: of rated output	± 2%
Hysterisis: of rated output	± 4%
Repeatability: of rated output	± 1.0%
Zero balance: of rated output	± 2%
Bridge resistance: ohms nominal	350
Temperature range, compensated: °F	+ 30 to + 150
Temperature range, useable: °F	- 65 to + 200
Temperature effect on output: of reading per °F	± 0.003%
Temperature effect on zero: of rated output per °F	± 0.003%
Overload rating, safe: of rated capacity	150%
Excitation voltage, maximum: volts DC or AC rms	20
Insulation resistance, bridge/case: megohms at 50 VDC	1000
Belt thickness: (maximum) inches	0.10
Belt width: (maximum) inches	2.00
Weight: in ounces	8
Available capacities: pounds	3500

Figure A-11 - LOAD CELL SPECIFICATIONS

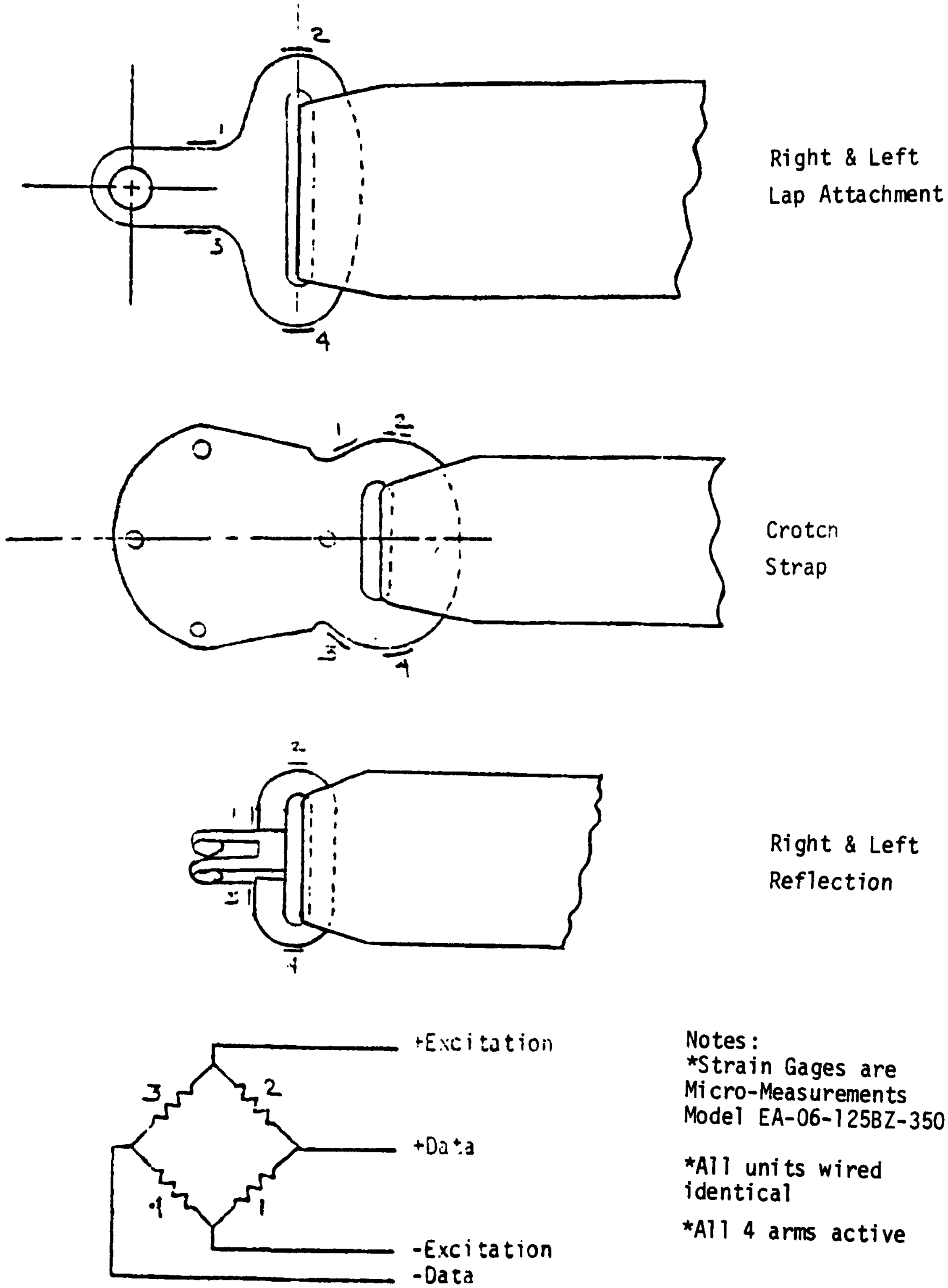


Figure A-12 - LOAD CELL SPECIFICATIONS (HARNESS HARDWARE)

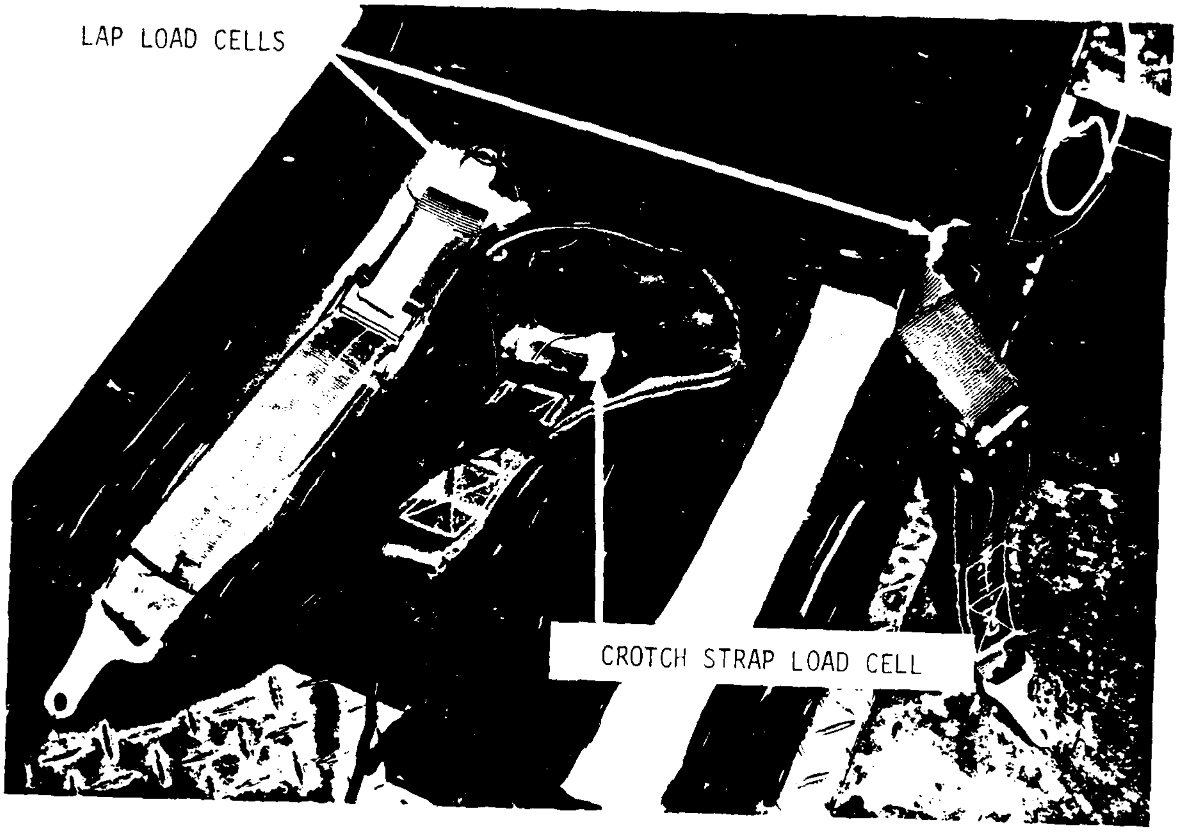
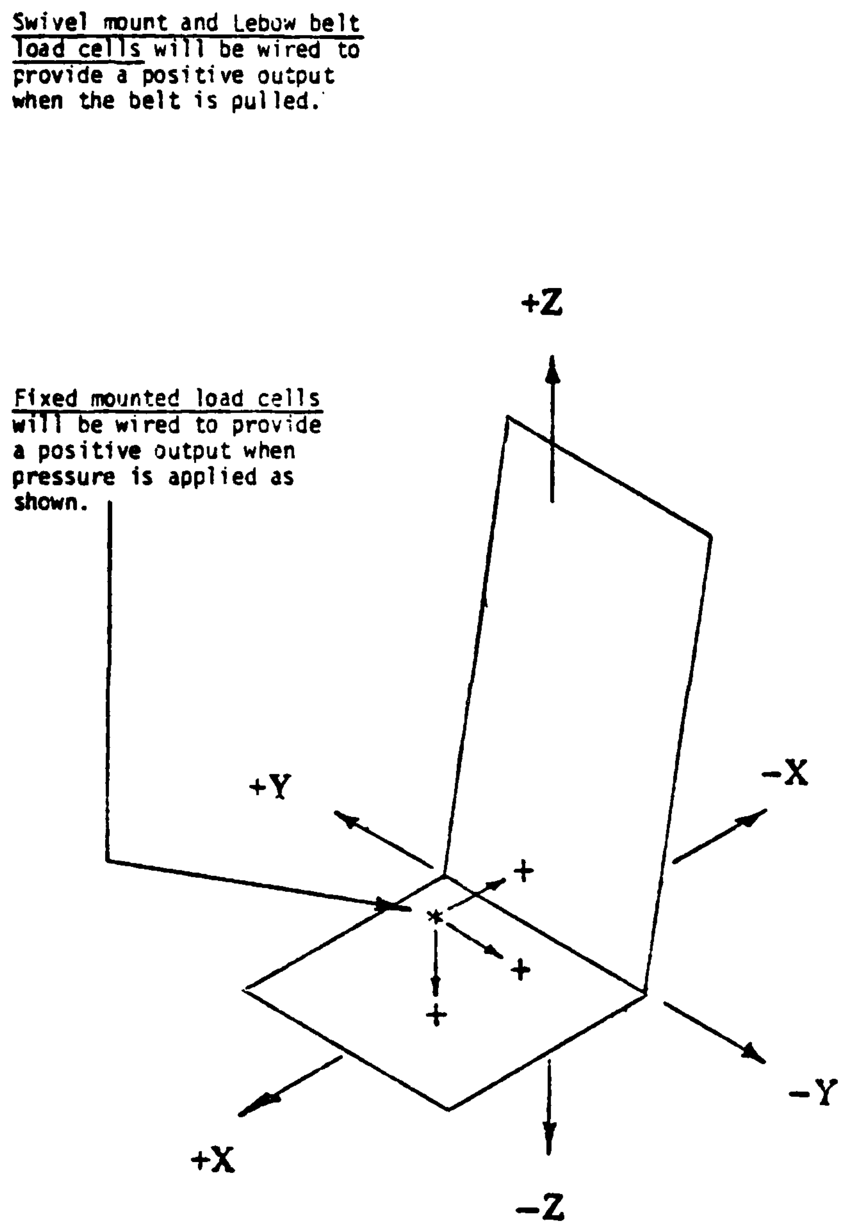


Figure A-13 - HARNESS INSTRUMENTATION

LOAD CELL COORDINATE SYSTEM



AMRL BBP COORDINATE SYSTEM
(Left Hand Rule)

Figure A-14

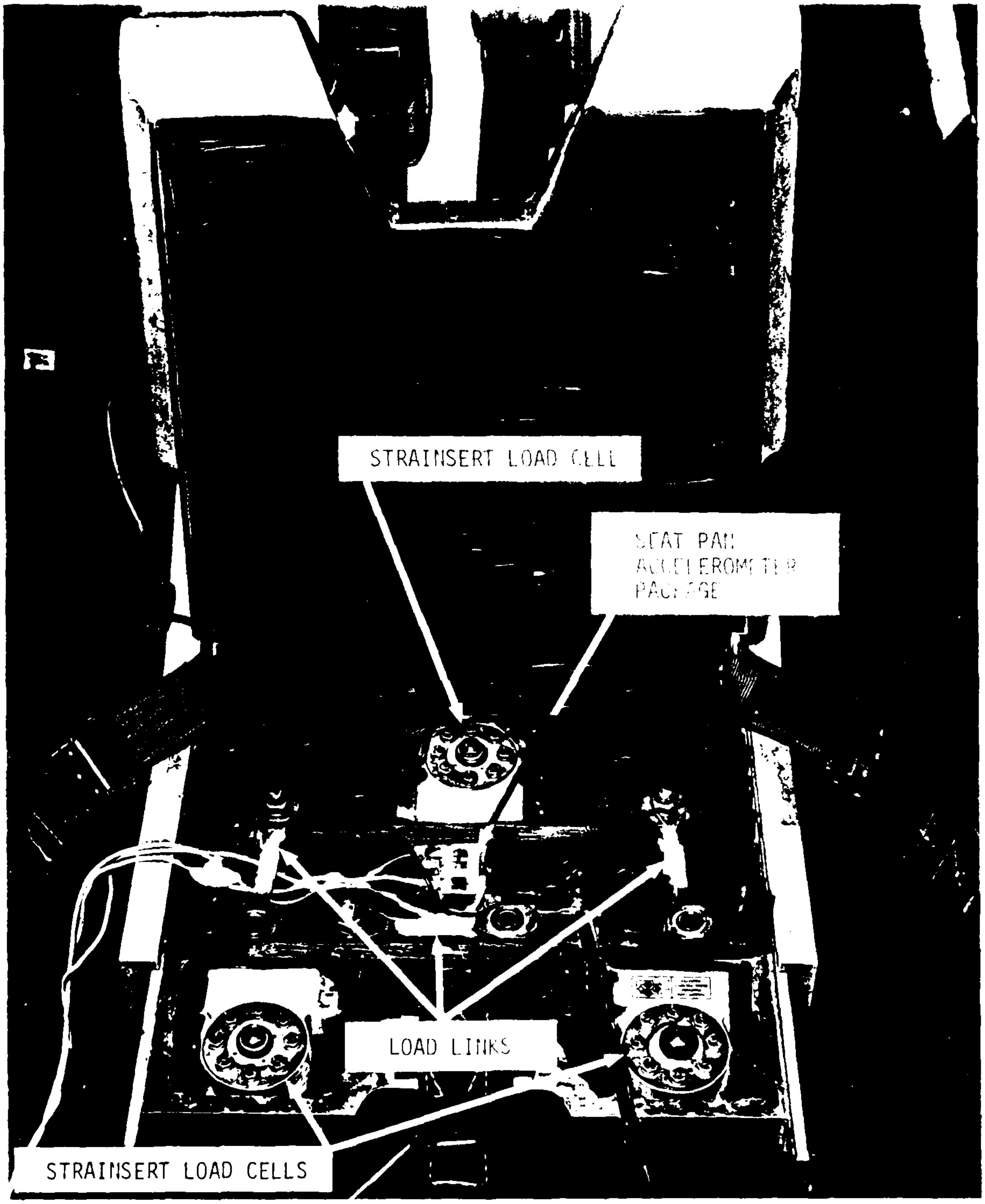


Figure A-15 - SEAT PAN INSTRUMENTATION

STRAINSERT
CALIBRATION DATA

U. S. Air Force Wright-Patterson AFB Dayton, Ohio Customer P.O. No. F33-601-76-86950	Q-3294 Strainsert Job No. Date: 10/16/76 Sign: CGH

Transducer: Universal Flat Load Cell, Model FL2.5U-2SPKT
2,500 lb. Capacity, 2 mv/v, 350 Ohms

Gages: EA-06-104ZA-175
Service Temp.: 150°F Max.
Calib. Temp.: 73°F

Type: C (Bendix PT02H-10-6P)
Ins. Res.: Over 10,000 megohms.
S/N: Q3294-6

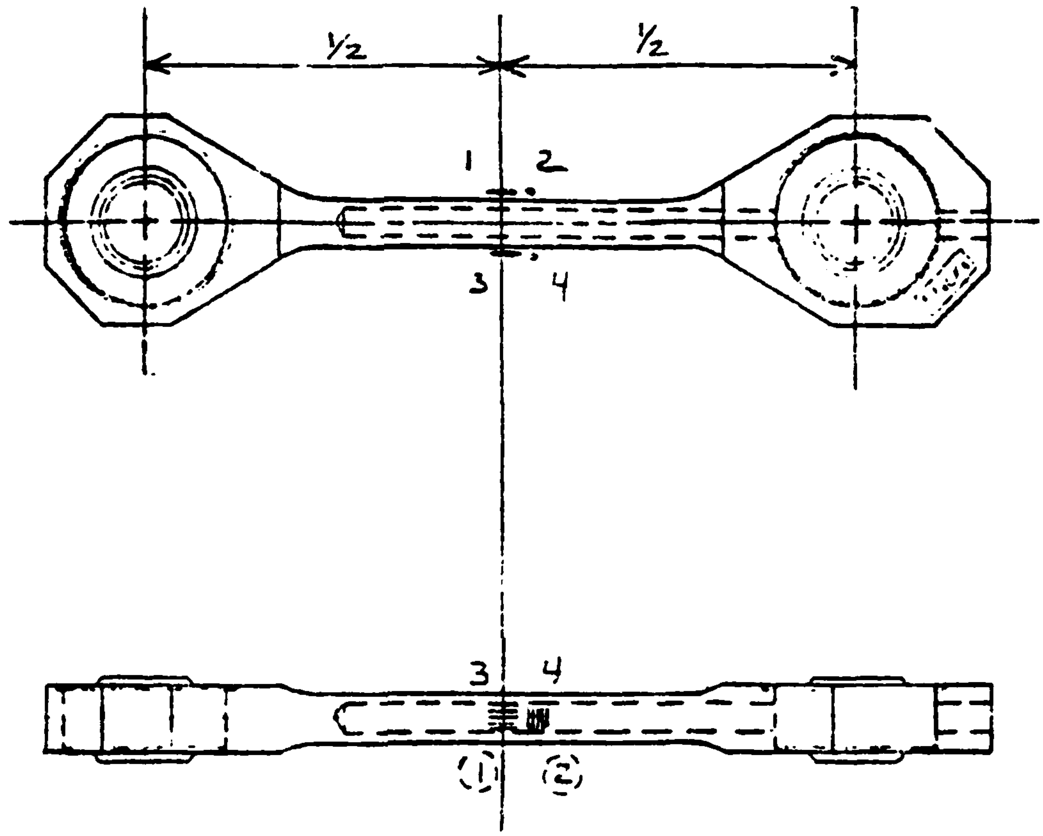
Load LBS.	Straight Line Signal Mv/v	Deviation, μv/v			Rep. μv/v
		Run 1	Run 2	Run 3	
0	0	0	0	0	0
500	0.400	-½	0	0	½
1,000	0.800	+½	+½	+½	0
1,500	1.200	0	0	0	0
2,000	1.600	-1	-1	-1	0
2,500	2.000	-½	-½	-½	0
2,000	1.600	-1	-½	-½	½
1,500	1.200	+1	+1	+1	0
1,000	0.800	+1½	+1½	+1½	0
500	0.400	+½	+1	+1	½
0	0	0	0	0	0
	Hysteresis	1	1	1	

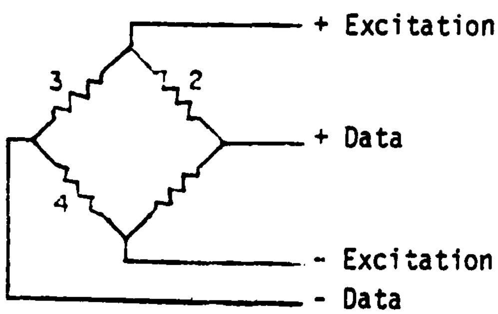
Calibration Analysis:

Non-Linearity:	1	parts in	2,000	=	.05%
Repetition					
Loading :	½	parts in	2,000	=	.03%
Unloading:	½	parts in	2,000	=	.03%
Zero Load:	0	parts in	2,000	=	--
Max. Load:	0	parts in	2,000	=	--
End Point :	½	parts in	2,000	=	.03%
Hysteresis :	1	parts in	2,000	=	.05%

Hold Down Bolts: 10-32NF; Torque = 6 ft. lb. lubricated

Figure A-16 - LOAD CELL SPECIFICATIONS





NOTES: *Strain Gages are Micro-Measurements Model EA-06-062TJ-350
*Z arms active

Figure A-17 - LOAD CELL SPECIFICATIONS (LOAD LINK)

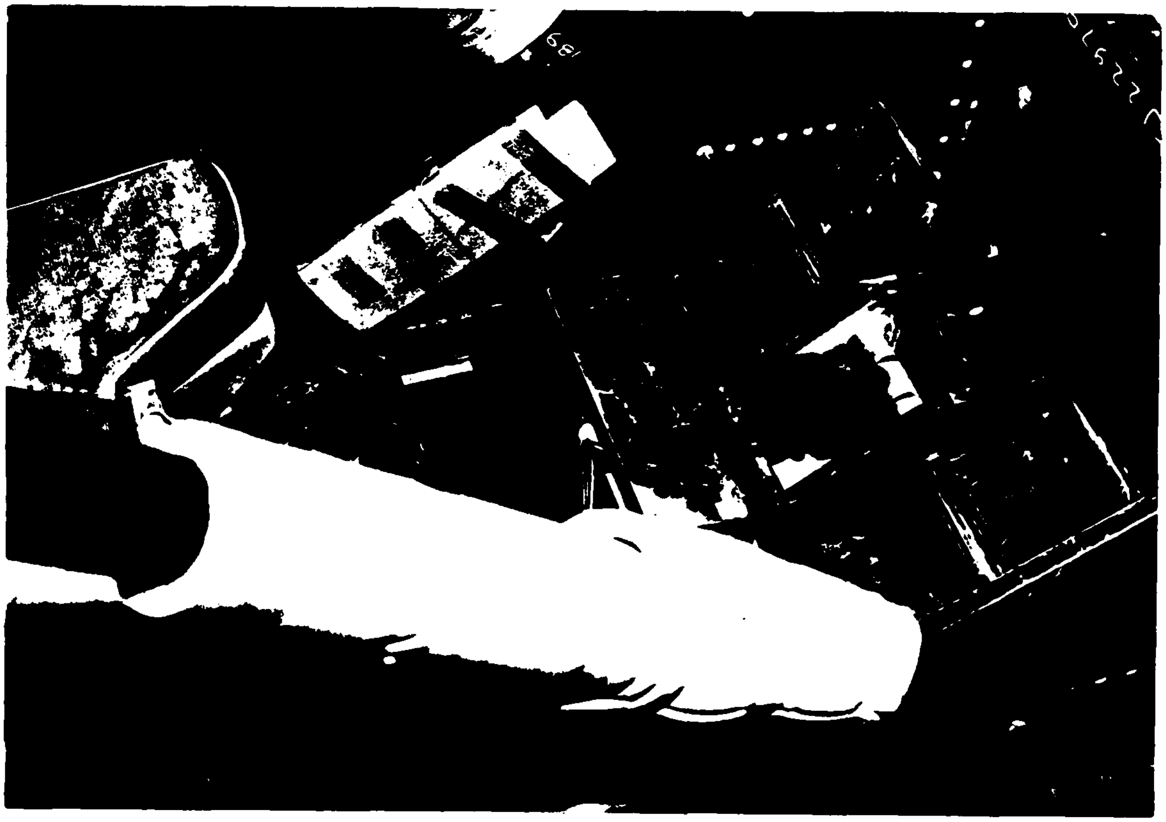
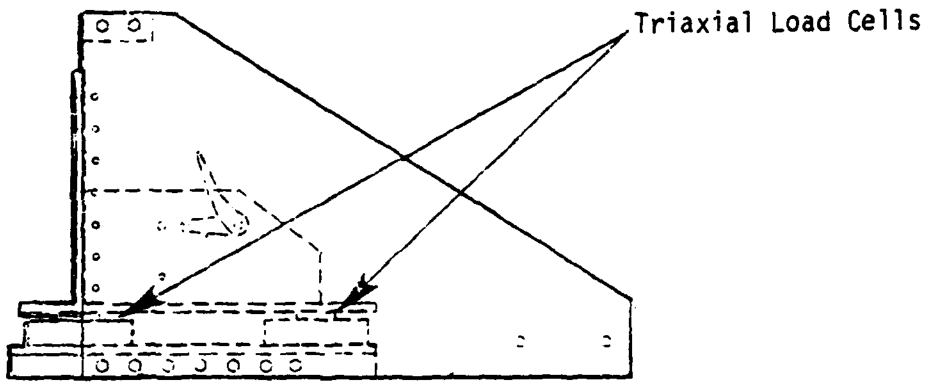


Figure A-18 - FOOT REST ASSEMBLY



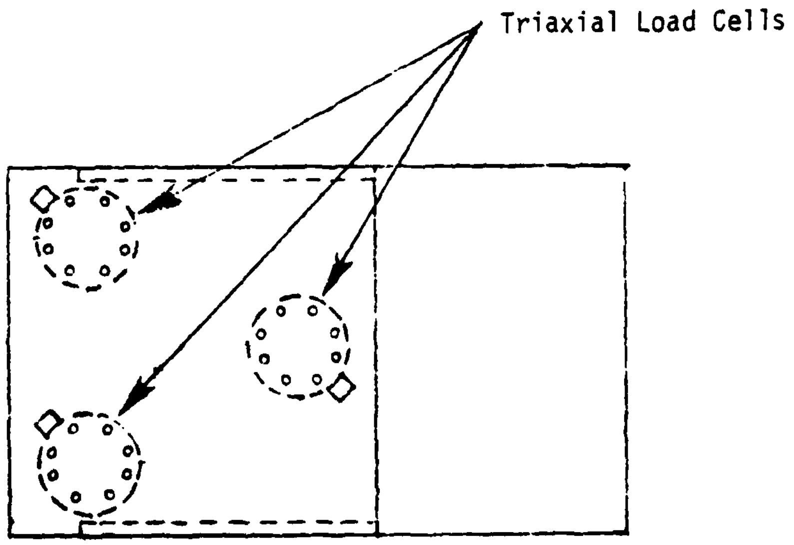
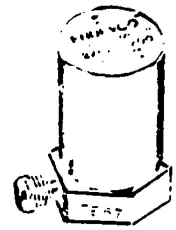


Figure A-19 - FOOT REST LOAD CELL LOCATIONS

2262A-200
2262CA-200

Damped, Overload Stops

PIEZORESISTIVE ACCELEROMETERS



SPECIFICATIONS FOR MODEL 2262A-200 and 2262CA-200 ACCELEROMETERS

	Models 2262A-200 (2262CA-200)*
DYNAMIC	
RANGE	-200 g to 200 g
OVERRANGE LIMITING	±300 to ±1 200 g
SENSITIVITY	2.5 mV/g typical (1.2 mV/g typical) 2 mV/g minimum (1 mV/g minimum)
MOUNTED NATURAL FREQUENCY (AT 75°F)	7 000 Hz typical
FREQUENCY RESPONSE	±5% maximum 0 to 3 000 Hz at 75°F, -25%, 10% typical at 0, 200°F and 3 000 Hz
DAMPING RATIO	0.7 typical
TRANSVERSE SENSITIVITY	3% maximum
THERMAL SENSITIVITY SHIFT	
LINEARITY AND HYSTERESIS	±2% of reading, maximum, to 200 g
ELECTRICAL	
EXCITATION	10.00 Vdc
INPUT RESISTANCE (AT 75°F)	1 600 Ω typical (1 000 Ω typical)
OUTPUT RESISTANCE (AT 75°F)	1 200 Ω typical (1 000 Ω typical)
INSULATION RESISTANCE	100 GΩ minimum
ZERO MEASURAND OUTPUT	±25 mV maximum

ENVIRONMENTAL

		0°F to +200°F
ACCELERATION LIMITS (In any direction)	Static	2 000 g
	Sinusoidal	1 000 g pk
	Shock	2 000 g half sine pulse
TEMPERATURE	Compensated	0°F to +200°F (-18°C to +93°C)
	Nonoperating	-20°F to +220 F (-29°C to +104°C)
HUMIDITY		Sealed by glass to metal fusion and welding.

Figure A-20 - ACCELEROMETER SPECIFICATIONS

PROGRAM Negative Shoulder Harness Angle Study DATE 28 Oct 80

VDT FACILITY RUN NO'S 454-528

DATA POINT	TRANSDUCER MFG & MODEL	S/N	PRE CAL		POST CAL		% CHANGE	COMMENTS
			DATE	SENS mV/g	DATE	SENS		
Carriage X	Endevco 2264-200	BX49	30 Sep80	2.581	22 Dec 80	2.569	- .5	
Carriage Y	Endevco 2264-150	BB11	30 Sep80	2.354	22 Dec 80	2.353	0	
Carriage Z	Endevco 2262A-200	FR42	09 Oct80	4.161	22 Dec 80	4.124	- .9	
Head X	Endevco 2264-200	BP10	30 Sep80	2.496	22 Dec 80	2.492	- .2	
Head Y	Endevco 2264-200	BQ42	30 Sep80	2.713	22 Dec 80	2.715	0	
Head Z	Endevco 2264-200	BQ51	30 Sep80	2.553	22 Dec 80	2.559	+ .2	
Chest X	Endevco 2264-150	BC26	29 Sep80	2.786	22 Dec 80	2.795	+ .3	
Chest Y	Endevco 2264-150	BB13	29 Sep80	2.430	22 Dec 80	2.420	- .4	
Chest Z	Endevco 2264-150	2A20	29 Sep80	2.619	22 Dec 80	2.634	+ .6	
Seat X	Endevco 2264-200	BV63	30 Oct80	2.564	23 Dec 80	2.574	+ .4	
Seat Y	Endevco 2264-200	BV41	30 Oct80	3.298	23 Dec 80	3.280	- .5	
Seat Z	Endevco 2264-200	BN63	30 Oct80	2.825	23 Dec 80	2.822	- .1	

Figure A-21 - PROGRAM CALIBRATIONS (PRE AND POST)

PROGRAM Negative Shoulder Harness Angle Study DATE 28 Oct 80

VDT FACILITY RUN NO'S 454-528

DATA POINT	TRANSDUCER MFG & MODEL	S/N	PRE CAL		POST CAL		% CHANGE	COMMENTS
			DATE	SENS uV/lb	DATE	SENS		
LF Load Link X	M.M. EA-06-062-TJ-350	001	03 Oct 80	10.79	29 Dec 80	10.73	-.6	
RT Load Link X	"	002	03 Oct 80	10.11	29 Dec 80	10.05	-.6	
Cen Load Link Y	"	004	03 Oct 80	10.23	29 Dec 80	10.20	-.3	
LF Lap	M.M. EA-06-125BZ-350	13	02 Oct 80	15.10	29 Dec 80	14.89	-1.4	
RT Lap	"	14	02 Oct 80	13.66	29 Dec 80	13.63	-.2	
N-G Strap	"	143377	03 Oct 80	1.80	29 Dec 80	[illegible]	-5.0	
LF Ref. Strap	"	02-10	02 Oct 80	26.32	29 Dec 80	25.47	-.9	
RT Ref. Strap	"	01-3	02 Oct 80	34.04	29 Dec 80	33.97	-.2	
LF Inert RL Strap	"	363	02 Oct 80	7.86	29 Dec 80	7.62	-.5	
RT Inert RL Strap	"	364	02 Oct 80	7.54	29 Dec 80	7.51	-.4	

Figure A-22 - PROGRAM CALIBRATIONS (PRE AND POST)

"X" AND "Z" AXIS COORDINATES OF SEAT PAN REFERENCE POINT
FOR ALL VARIABLES OF SEAT HEIGHT AND SEAT PAN POSITION

SEAT HEIGHT	"X" AXIS SEAT PAN POSITION 1	2	3	4	5	6	"Z" AXIS SCALE
1	-16.60	-17.52	[illegible]	-19.50	-20.50	[illegible]	+11.16
2	-16.80	-17.80	[illegible]	-19.32	-20.82	-21.72	+10.50
3	-17.07	-18.27	-18.37	-20.07	[illegible]	[illegible]	+9.62
4	-17.35	-18.35	-19.35	[illegible]	-21.15	-22.35	+8.55
5	-17.63	-18.63	-19.63	-20.53	-21.63	-22.63	+7.68
6	-17.92	-18.92	-19.92	-20.92	-21.72	-22.72	+6.68

*"Y" AXIS COORDINATES ARE ±0 FOR ALL CONDITIONS

"X" AXIS COORDINATES OF FOOTREST ASSEMBLY REFERENCE POINT
FOR ALL VARIABLES OF FOOTREST POSITION

"X" AXIS FOOTREST POSITION 1	2	3	4	5	6	7
-46.0	-47.0	-43.0	-44.0	-53.0	-51.0	-52.0

*"Y" AND "Z" AXIS MEASUREMENTS ARE ±0 FOR ALL CONDITIONS

ALL MEASUREMENTS ARE REFERENCED TO THE SEAT ZERO REFERENCE

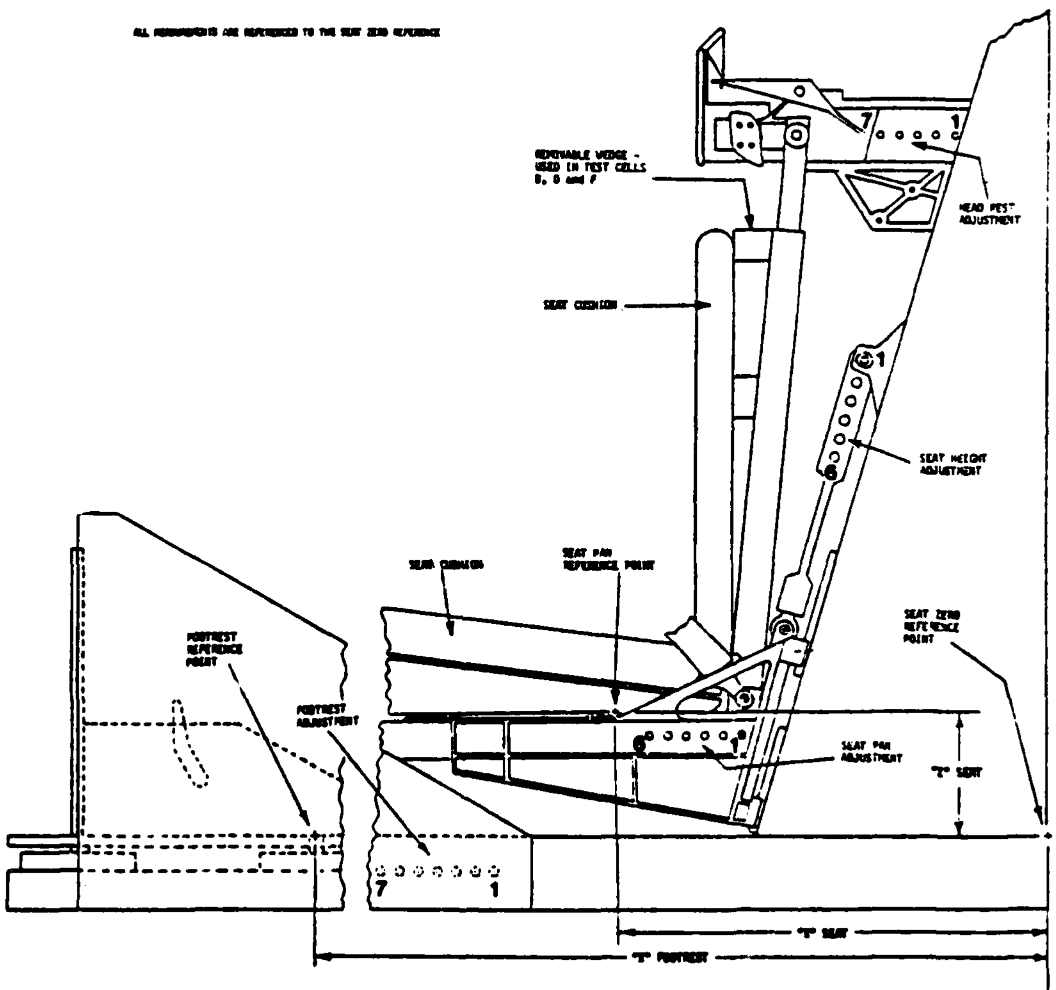


Figure A-23 - SEAT GEOMETRY

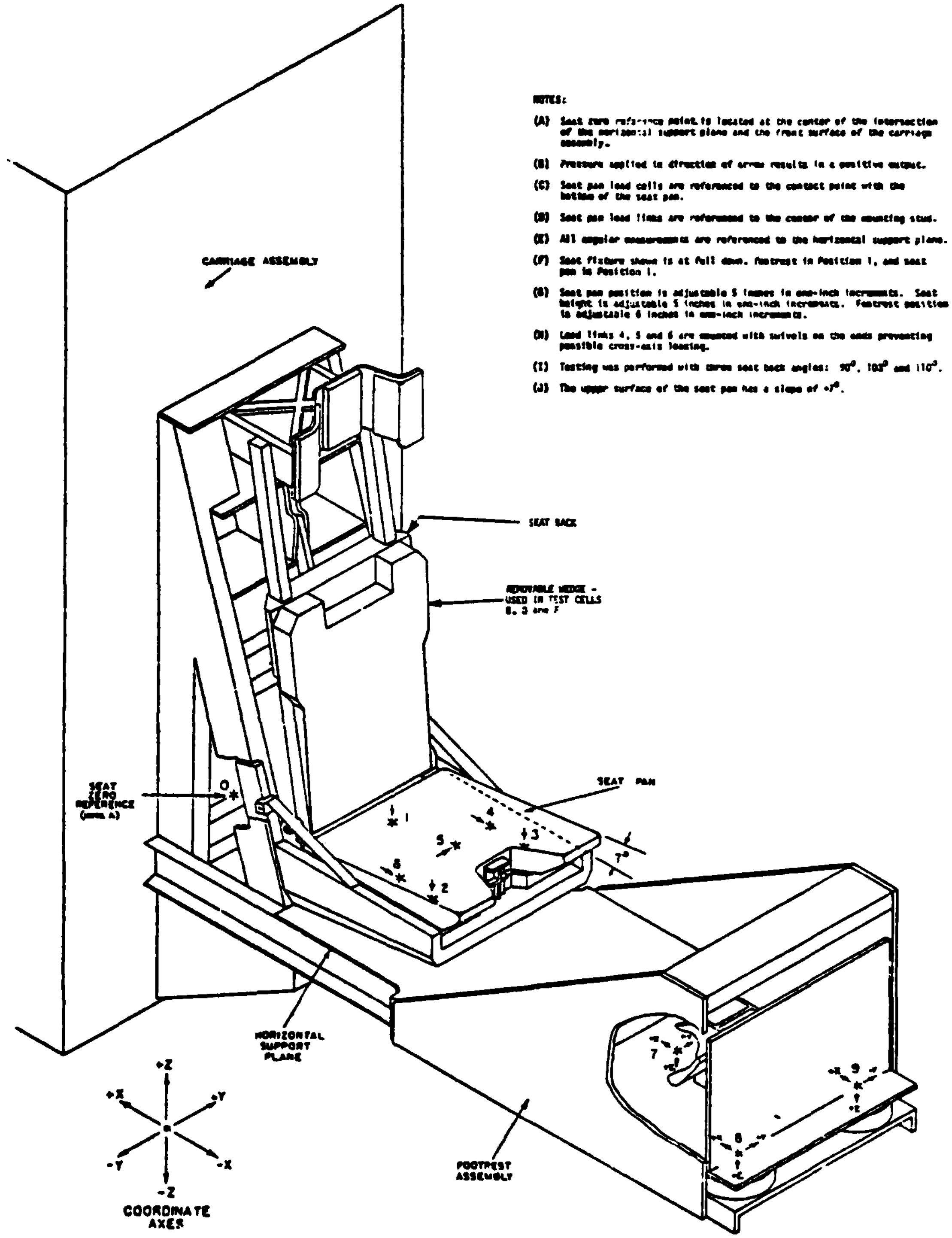


Figure A-24 - SEAT GEOMETRY

AUTOMATIC DATA ACQUISITION AND CONTROL SYSTEM

CARRIAGE DIGITAL DATA ACQUISITION SYSTEM EQUIPMENT

Figure A-25 is a photograph of the Carriage Digital Data Acquisition System. Figure A-26 shows the block diagram of the Carriage Digital Data Acquisition System. This system consists of four parts: the power conditioner, the signal conditioner and sensors, the encoder and the junction box. The power conditioner requires a 28 vdc, 4A power source and provides several regulated supplies. They are the +15 and -12 vdc (0.8A) supply for the signal conditioners, the 5 vdc and the 10 vdc bridge excitation voltages (1.2A total), and the 2.5 vdc signal output bias voltage (0.1A). The 28 vdc source also powers the pulse code modulator (PCM) encoder (0.24A).

The signal conditioner consists of 48 signal modules. Each module is capable of processing a sensor (transducer) signal which can be a voltage generating source or a bridge-type sensor. If a bridge-type sensor is used, the bridge excitation voltage is selectable from the 5V or the 10V source. By connecting the proper external resistors to the module input connector a half bridge is completed. A full or half bridge is balanced by connecting external resistors to its module input connector.

The signal conditioning module consists of a amplifier section and a filter section. The amplifier gain can be selected by inserting one of seven external gain plugs. These gains provide the capability of covering an input dynamic range from 50 mV up to 5 V. The filter section can be programmed by inserting one of four external filter plugs. These filter plugs are in accordance with the SAE recommended classes 60, 180, 600 and 1000.

The 48 channel data signals are time multiplexed and digitized via an encoder into 48 11-bit digital words. Two additional 11-bit synchronization (sync) words are added to the data frame. The 50-word frame is then sampled at a rate of 1000 samples/second. These serial digital data along with three additional synchronization pulse trains (bit sync, word sync, and frame sync) are connected to the computer room by four twisted pairs incorporated into a drag cable. They pass through a junction box to the digital computer interface to allow recording and processing.

PDP 11-34 DATA COLLECTION AND STORAGE

The PDP 11-34 minicomputer is the main control for all electronic data collection and storage functions. The block diagram of Figure A-27 shows the processor and its related equipment. All data transfer in the data collection system are under software control by the central processor unit. Serial data are constantly being received by the data formatter unit from the carriage data encoder. These data are converted by the data formatter from serial to parallel for input via a buffered data channel to computer memory for storage on disk. Finally, the data are transferred from disk to magnetic tape for permanement storage following the test event.

QUICK LOOK INERTIAL DATA

After each test, the data were sampled and checked. This check was made using the Single Channel ANalysis (SCAN) routine for the PDP 11-34 processor. This routine allows the operator to access and plot up to 2000 points of data for any of the 48 data channels. The operator selects the channel to be processed and enters its location description as well as the start and stop points to be processed. A maximum of 2000 milliseconds or 2000 data points may be accessed for each plot. The program converts the raw data into the appropriate units of measure and calculates the minimum and maximum values during the sample interval. If the sample is acceleration data, the velocity will also be calculated using an integration process.

An added optional feature is a digital smoothing routine which can smooth the data to remove any excess high frequency component that may be present.

FOOT REST AND SEAT PAN CORRECTION

Dynamic foot and seat pan loads were corrected by removing the effects of the foot support fixture and seat pan loading on supporting load cells.

A series of tests was conducted to determine the percentage of the total force resting on each cell. The weight assessed each load cell and multiplied by the carriage acceleration was subtracted from the acquired test data in the processing.

In practice, the load cell outputs are zeroed with the foot support fixture and seat pan weight resting on the load cells. During a drop, with no payload, the sum output of the load cells would reflect the weight of the fixture as a negative load (fixture weight removed from the load cell). The data were processed to remove this effect and thus reflect a zero output during a drop with no payload.

The final foot and seat pan loads were processed to provide corrected values which represent actual loads encountered by the human or dummy subjects.

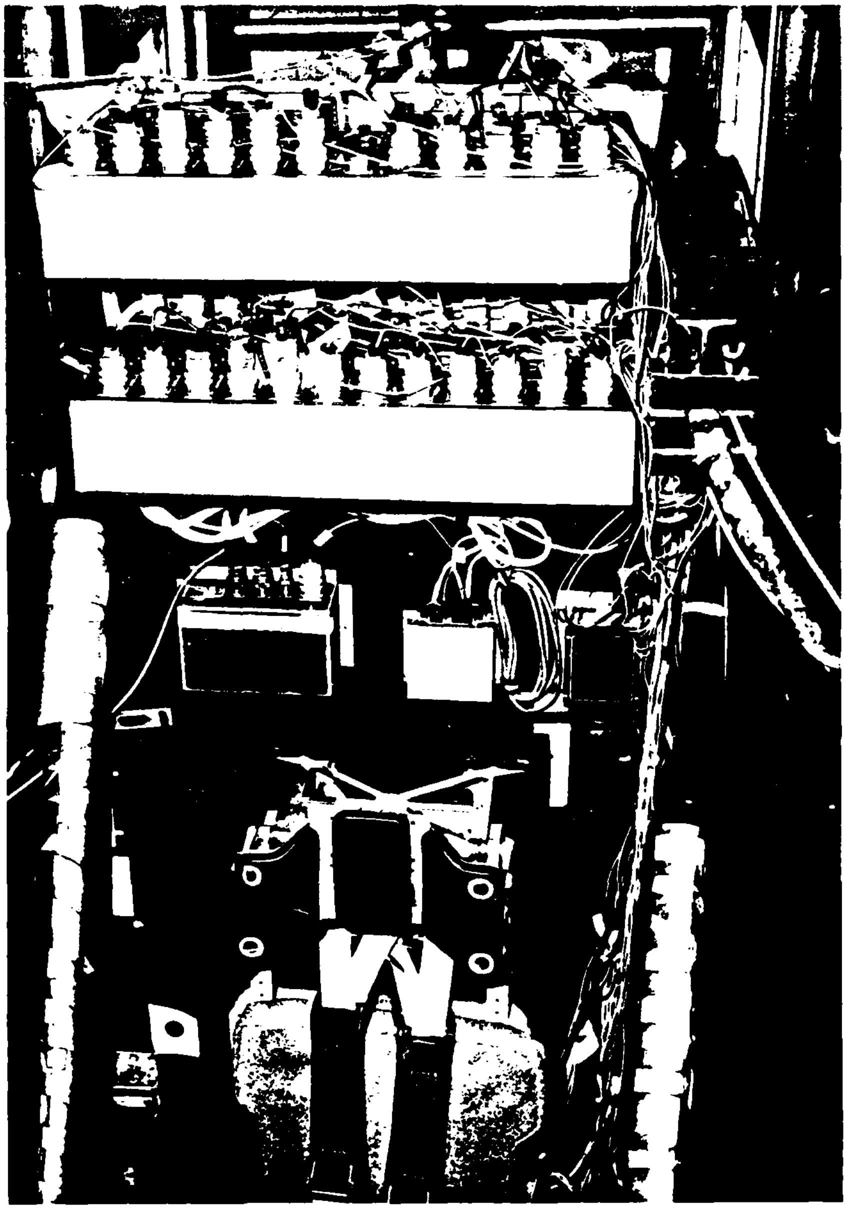


Figure A-25 - CARRIAGE DIGITAL DATA ACQUISITION SYSTEM

AD-A113 957 AIR FORCE AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATT--ETC F/G 1/3
COMPARATIVE VERTICAL IMPACT TESTING OF THE F/FB-111 CREW RESTRA--ETC(U)
MAR 82 B F HEARON, J W BRINKLEY, J H RADDIN
UNCLASSIFIED AFAMRL-TR-82-13 NL

2 OF 4
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113957

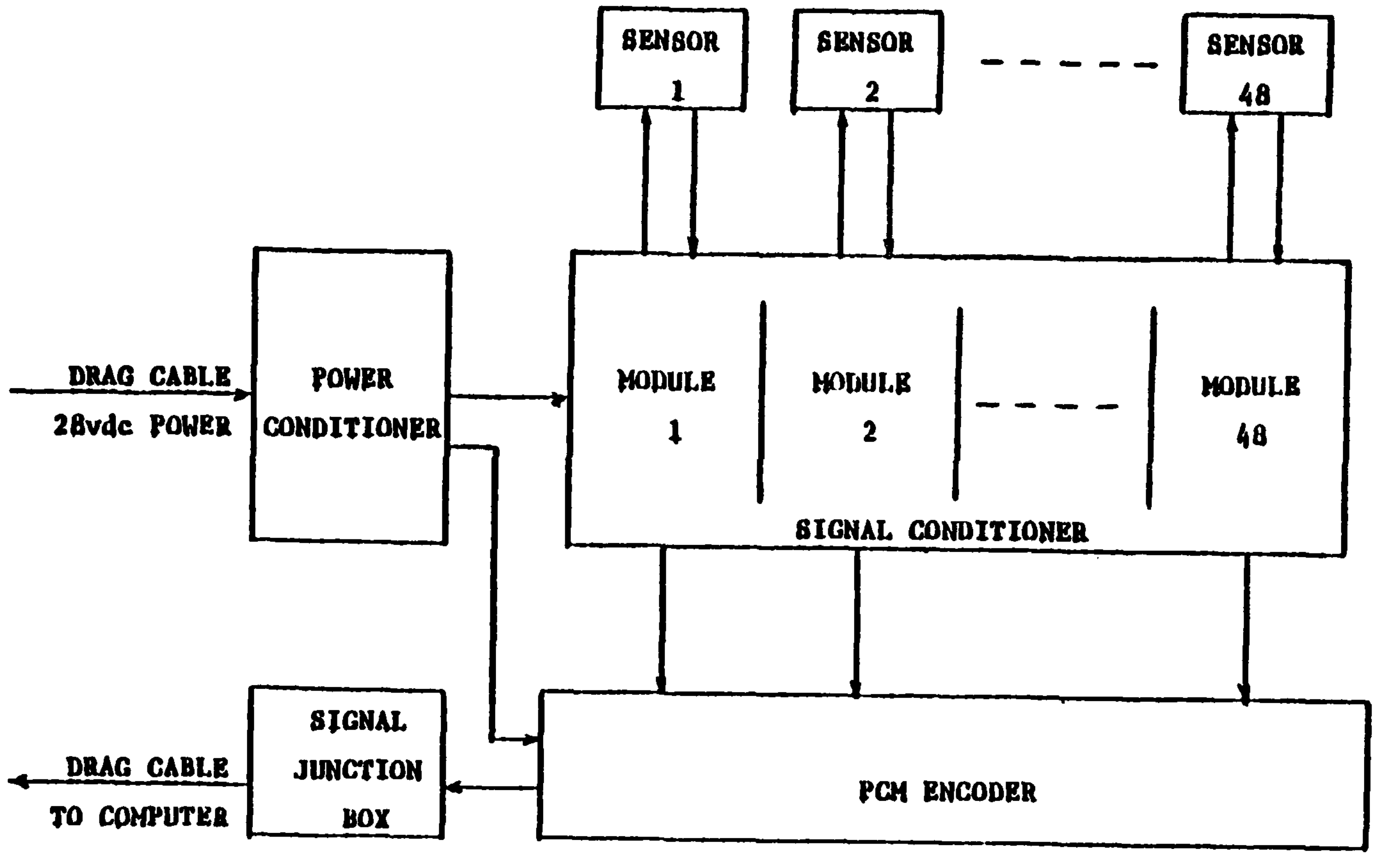


Figure A-26 - CARRIAGE DIGITAL DATA ACQUISITION SYSTEM BLOCK DIAGRAM

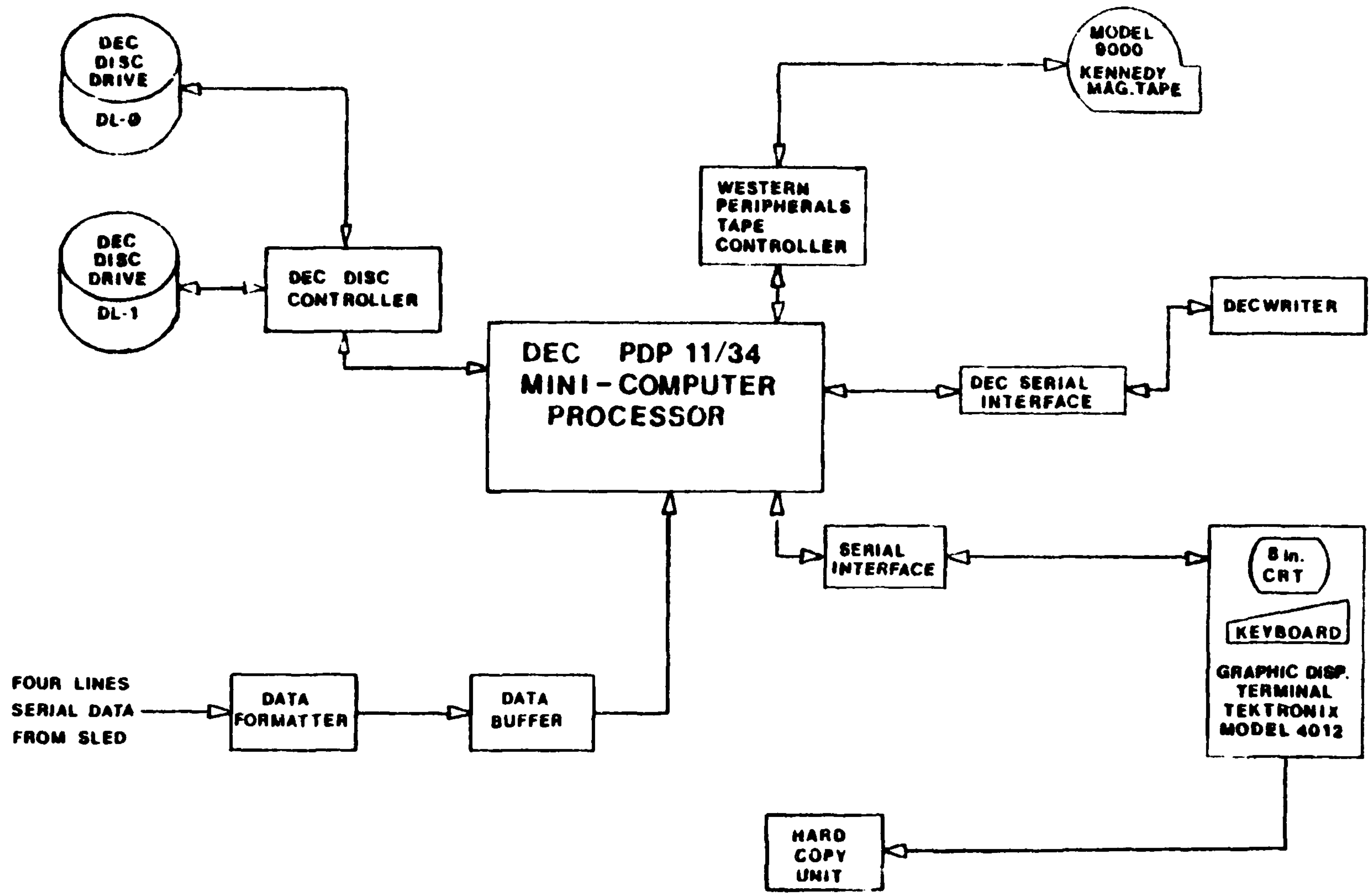


Figure A-27- CENTRAL DATA ACQUISITION AND STORAGE SYSTEM

KINEMATIC DATA ACQUISITION SYSTEM

HIGH SPEED CAMERAS AND CONTROL

Kinematic data were acquired through the use of high speed 16mm cameras operating at a rate of 500 frames per second. The cameras were Teledyne Milliken Model DBM45 pin registered units which were capable of withstanding 25 G. Two cameras were mounted to the carriage, one to provide a frontal view and one to provide a right lateral view of the subject. During a test, the cameras were started and stopped automatically by the Camera and Lighting Control Station which is part of the impact facility safety and control system. The cameras were started at a preset time in the test sequence and run for a period of 8 seconds.

AUTOMATIC FILM READER

The AFR subsystem was developed by Photo Digitizing Systems, Inc. It automatically extracts photo data, digitizes it and records it on magnetic tape. The subsystem consists of:

Film motion analyzer with 16mm projection head
Electronic scanning camera
Control Unit
Alphanumeric Cathode Ray Tube (CRT)
Line printer
Magnetic tape transport

The film reader recognizes quandrant or circular fiducial targets. It automatically tracks targets and extracts data for up to twelve targets per film frame at a minimum rate of one-half frame per second. Film may be processed through the reader manually or automatically.

Figure A-28 is a block diagram of the Automatic Film Reader System (AFR). The X-Y coordinate position of each target on each film frame is input to the computer and recorded on magnetic tape.

A NOVA 3/12 computer controls the AFR which contains 16K, 16-bit, words of core memory, a CRT terminal, and a magnetic tape transport with suitable interface. In addition, a parallel data link is provided between the NOVA 3/12 and the PDP 11/34.

An alphanumeric CRT (DGC 6052) automatically displays the AFR control information. The CRT display and its keyboard function are used as separate devices. The keyboard is a transmit-only device and the display is a receive-only device but has the additional capability of transmitting cursor position information on program request.

A hard copy device, LA36 Decwriter II, provides hard copies of the information presented on the 6052 CRT. The LA36 is medium-sized interaction terminal with a low-speed impact printer and a standard ASCII keyboard consisting of alphanumeric characters and non-printing system control codes.

Either the Decwriter or the 6052 CRT output may be assigned to the PDP 11/34A. Programs can also be established which can "down load" from the disc on the PDP 11/34A to the NOVA, or digital film data can be loaded on the PDP 11/34A for processing or disc storage.

QUICK LOOK KINEMATIC DATA

The Instar (Instant Analytical Replay) System is a high-performance video recorder and display device designed for the analysis of high speed motion. It is a compact, portable, fully transistorized instrument that combines the long recording capacity and instant replay features of video tape. The system records 120 frames/second with an effective shutter speed of 10us or less and will playback all recordings in real time, stop action, reverse slow motion, and variable slow motion (2%-15% of real time). Each of the frames is sequential and non-interlaced.

Instar incorporates two cameras and a special effects generator for the added flexibility of split screen. The simultaneous display of two events offers the precise evaluation of three dimensional problems

or the referencing of one physical event to an instrument (i.e., digital clock or oscilloscope). Other features include:

End of tape sensing
Foolproof logic control sequences
Dynamic braking
Interscene blanking
Video logic signal processing modules

The Instar System was utilized to record each impact event. This video tape was available for review by the test conductor and/or medical monitor immediately after the impact event.

TIMING REFERENCE

A 100 PPS timing signal was an integral part of the Kinematic Data Acquisition System. The Camera and Lighting Control Station started the timing signal at T = 0. An event signal was generated less than one second after T = 0. This event signal performed two functions. It triggered a photo flash unit which marked the film frame at the beginning of the impact event. Second, it started the 100 PPS signal to the LED drivers, LM Dearing Model 2/3/3R. The LEDs, located in the high-speed cameras, were pulsed every 10 ms which produced a .75 ms timing bar on the edge of the film. The diagram of Figure A-29 shows the 100 PPS signal, the event signal and the LED driver signal. Figure A-30 illustrates the event and timing bar in relationship to the film.

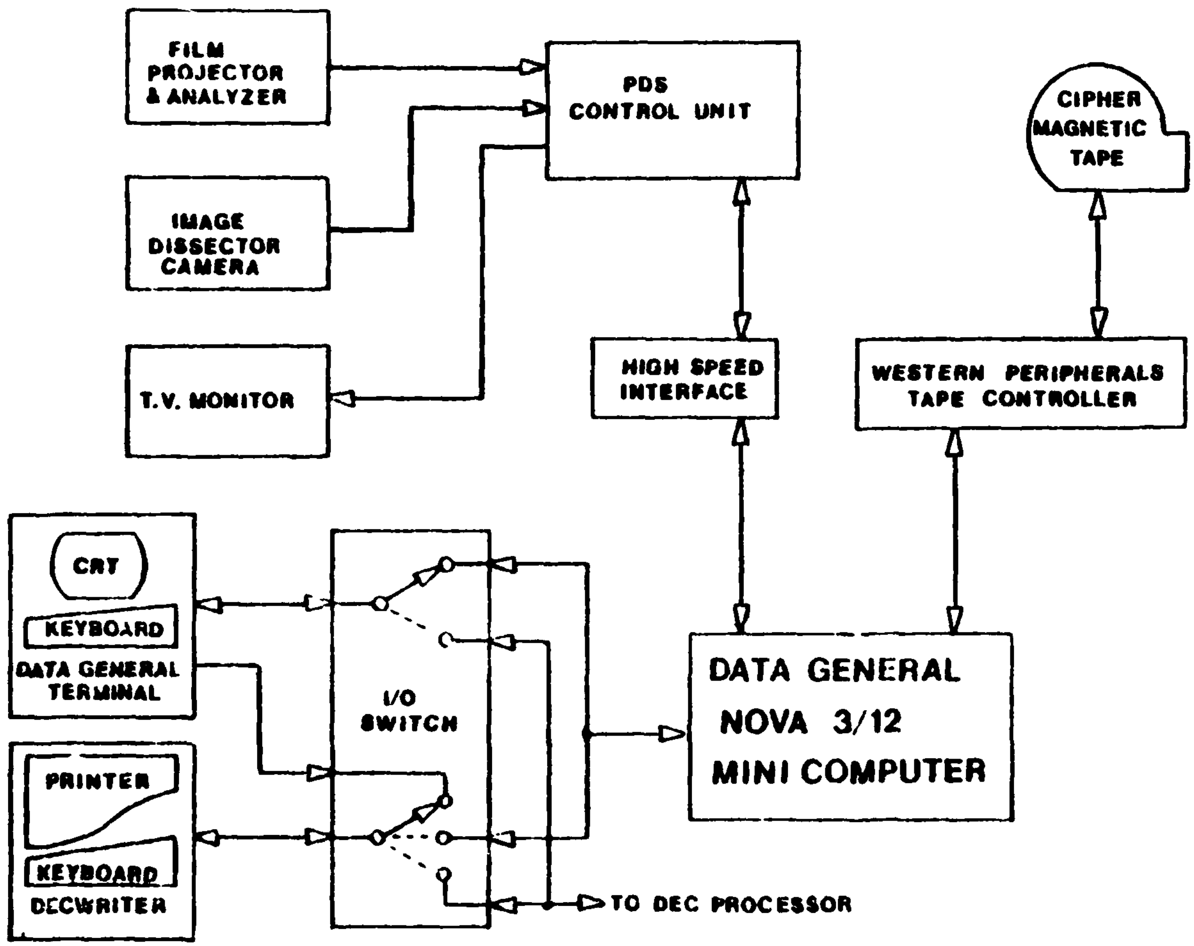


Figure A-28 - AUTOMATIC FILM READER SYSTEM BLOCK DIAGRAM

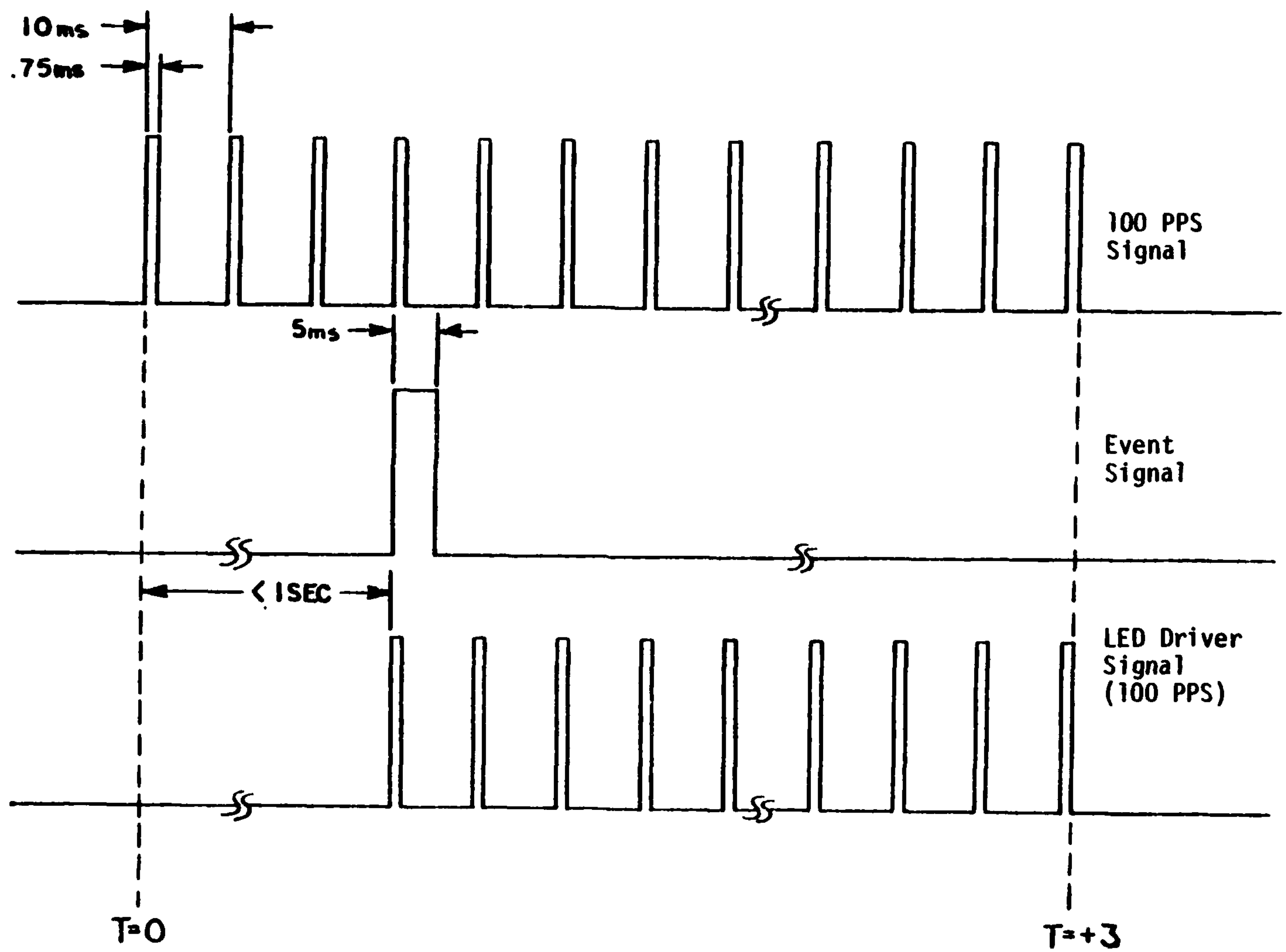


Figure A-29 - TIMING REFERENCE

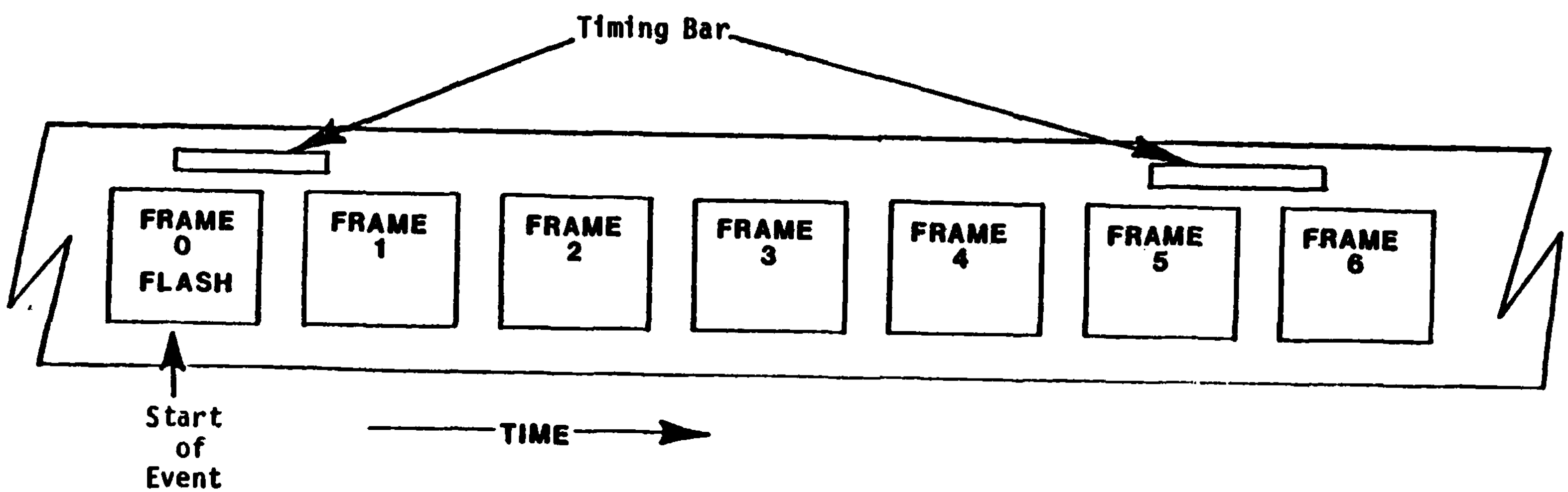


Figure A-30 - TIMING REFERENCE

APPENDIX B

SUMMARY OF ELECTRONIC DATA

The means and standard deviations of all peak measured and computed parameters from each cell of experimental matrix are shown in Table B-1. (The cell designations are explained in the experimental design matrix, Table 1, in the body of the report.) In addition, the maximum and minimum values of each parameter are tabulated for each test conducted at the experimental level. The times at which these values were achieved during the impact are also tabulated. These data are grouped according to test condition. Finally, a set of analog data from each test condition is presented. To permit comparability among these data, the test results of the same subject, S3, are shown in each test condition. This subject was selected because his tabulated maxima and minima in each of the four tests were not beyond 2.5 standard deviations of the mean and because the subject's body weight, standing height, and sitting height were close to the means of those anthropometric measurements for the sample under investigation. (See Table 2.)

All electronic data derived from this test program will be maintained by the Biomechanical Protection Branch of AFAMPL until this work unit is retired. These experimental results will eventually be recorded in a permanent data bank within the Laboratory.

TABLE B-1

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA

(Peak values are tabulated for velocity, accelerations and loads.)

MATRIX CELL	C		G	
F/FB-111 HARNESS	MODIFIED		OPERATONAL	
SEAT POSITION	DOWN		DOWN	
	(n = 15)		(n = 18)	
	MEAN	s	MEAN	s
CARRIAGE ACCELERATION (G)	10.5	0.14	10.6	0.20
CARRIAGE VELOCITY (ft/sec)	-25.8	0.16	-25.9	0.57
SEAT ACCELERATION (G)	10.6	0.14	10.8	0.33
CHEST ACCELERATION (G)				
-X axis	-1.98	1.02	-2.11	0.62
+X axis	4.51	1.26	3.42	1.02
+Z axis	20.0	2.92	17.1	2.20
Resultant	20.3	2.81	17.3	2.18
CHEST SEVERITY INDEX	35.2	5.72	32.5	4.13
HEAD ACCELERATION (G)				
-X axis	-4.79	0.93	-3.18	1.04
+X axis	1.22	0.95	1.72	0.97
+Z axis	13.2	0.91	12.5	0.77
Resultant	13.3	0.91	12.6	0.80
HEAD SEVERITY INDEX	19.6	2.14	19.4	2.05
STRAP LOADS (lb)				
Reflection Straps	104	24	67	20
Inertia Reel Straps	111	27	78	25
Total Shoulder Straps	206	52	137	35
Total Lap Belt	95	29	89	27
SEAT PAN LOADS (lb)				
-X axis	-290	70	-276	63
+Z axis	1760	237	1740	257
Resultant	1780	240	1760	258
FOOTREST LOADS (lb)				
-X axis	-390	117	-400	96
+Z axis	467	72	471	75
Resultant	558	120	573	107

TABLE B-1 (continued)

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA

(Peak values are tabulated for velocity, accelerations and loads.)

MATRIX CELL	H		J	
F/FB-111 HARNESS	MODIFIED		OPERATONAL	
SEAT POSITION	UP		UP	
	(n = 15)		(n = 14)	
	MEAN	s	MEAN	s
CARRIAGE ACCELERATION (G)	10.5	0.18	10.5	0.24
CARRIAGE VELOCITY (ft/sec)	-26.1	0.14	-26.2	0.06
SEAT ACCELERATION (G)	10.7	0.38	10.6	0.30
CHEST ACCELERATION (G)				
-X axis	-1.77	0.86	-2.59	0.97
+X axis	3.66	1.37	2.68	1.34
+Z axis	18.3	1.96	17.2	2.04
Resultant	18.6	1.88	17.4	2.02
CHEST SEVERITY INDEX	34.4	4.25	32.1	2.92
HEAD ACCELERATION (G)				
-X axis	-4.07	1.03	-3.24	1.07
+X axis	1.72	1.29	2.31	1.25
+Z axis	13.0	0.94	12.6	0.94
Resultant	13.2	0.97	12.9	0.96
HEAD SEVERITY INDEX	19.8	2.20	20.4	1.91
STRAP LOADS (lb)				
Reflection Straps	80	13	63	13
Inertia Reel Straps	86	22	95	34
Total Shoulder Straps	156	35	150	45
Total Lap Belt	97	20	102	27
SEAT PAN LOADS (lb)				
-X axis	-295	68	-281	57
+Z axis	1760	204	1770	215
Resultant	1790	207	1790	217
FOOTREST LOADS (lb)				
-X axis	-338	94	-324	79
+Z axis	461	83	443	71
Resultant	530	107	508	99

NEG SHLD HAR AND [illegible] 210.0 G: 10 GP: 1 CELL: [illegible]

DATA ID	MAX	MIN	1	2	CH
10V EXT PWR	10.05	9.97	2258.00	[illegible]	[illegible]
CARRIAGE X	1.34	-0.91	3835.00	[illegible]	[illegible]
CARRIAGE Y	0.74	-1.00	3865.00	[illegible]	31
CARRIAGE Z	12.06	-0.24	3858.00	3681.00	1
CARRIAGE Z (SM)	10.51	-0.08	3858.00	3654.00	
CARRIAGE VEL	-1.11	-25.82	4163.00	3832.00	29
SEAT X	1.93	-1.34	3823.00	3829.00	32
SEAT Y	0.81	-0.99	3968.00	3844.00	33
SEAT Z	11.57	-0.26	3863.00	3690.00	34
SEAT Z (SM)	10.59	-0.16	3864.00	3687.00	
CHEST X	5.23	-1.60	3878.00	3910.00	5
CHEST Y	-0.28	-3.22	3856.00	3897.00	6
CHEST Z	16.73	-1.27	3895.00	3638.00	7
CHEST RES	17.17	0.77	3893.00	4141.00	
CHEST SI	27.57		3827.00	3959.00	
HEAD X	.09	-4.62	3733.00	3906.00	2
HEAD Y	2.08	0.28	3888.00	3980.00	3
HEAD Z	13.74	-1.32	3876.00	3698.00	4
HEAD RES	14.02	0.67	3876.00	3988.00	
HEAD SI	21.47		3831.00	3984.00	
HEAD HIC	16.33		3850.00	3921.00	
SHD REFL LF	59.61	23.19	3884.00	3973.00	14
SHD REEL LF	56.03	9.25	3931.00	3872.00	16
LF SHOULDER	97.16	55.39	3907.00	3983.00	
SHD REFL RT	54.51	16.10	3902.00	4100.00	15
SHD REEL RT	41.06	2.93	3909.00	3860.00	17
RT SHOULDER	92.79	37.11	3907.00	3860.00	
TOTAL SHLD REFL	105.38	46.37	3898.00	3974.00	
TOTAL SHLD REEL	95.09	13.03	3909.00	3869.00	
TOTAL SHOULDER	189.95	93.74	3907.00	3860.00	
TOTAL SHD / WT	0.90	0.45	3907.00	3860.00	
LF LAP BELT	56.81	32.18	3970.00	3858.00	8
RT LAP BELT	43.91	27.65	4052.00	3859.00	9
TOTAL LAP	95.53	59.92	3970.00	3859.00	
TOTAL LAP / WT	0.45	0.29	3970.00	3858.00	
CROTCH STRAP	283.31	-13.43	3960.00	3880.00	10
LF SEAT LNK X	52.29	-172.19	4095.00	3878.00	18
RT SEAT LNK X	30.01	-94.32	3937.00	3873.00	19
TOTAL SEAT X	69.06	-265.36	3937.00	3873.00	
SEAT LNK Y	78.12	-42.33	3924.00	3876.00	35
LF SEAT PAN Z	587.40	38.59	3876.00	3695.00	11
RT SEAT PAN Z	457.49	35.90	3875.00	3620.00	12
CT SEAT PAN Z	1166.34	91.54	3878.00	3615.00	13
TOTAL SEAT Z	2210.54	173.85	3876.00	3602.00	
TOTAL SEAT Z / WT	10.53	0.83	3876.00	3602.00	
RES SEAT FORCE	2226.09	175.45	3876.00	3602.00	
RES SEAT FORCE / WT	10.60	0.84	3876.00	3602.00	
LF FOOT X	28.44	-164.13	3824.00	3876.00	20
RT FOOT X	11.81	-199.67	3823.00	3876.00	23
CT FOOT X	30.50	-207.42	3825.00	3876.00	26
TOTAL FOOT X	67.21	-571.22	3824.00	3876.00	
LF FOOT Y	156.30	-23.64	3869.00	3832.00	21
RT FOOT Y	26.09	-169.14	3824.00	3868.00	24
CT FOOT Y	19.83	-37.13	3896.00	3835.00	27
TOTAL FOOT Y	46.38	-48.84	3896.00	3833.00	
LF FOOT Z	196.13	-34.90	3869.00	3964.00	22
RT FOOT Z	251.58	0.89	3861.00	3972.00	25
CT FOOT Z	171.56	-77.91	3884.00	3835.00	28
TOTAL FOOT Z	599.02	-37.04	3869.00	3810.00	
RES FOOT FORCE	765.67	40.29	3869.00	3973.00	

NEG SHLD HAR ANG   TEST: 406   SUBJ: F-3   WT: 166.0   G: 10   GP: 1   CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.06	9.96	773.00	2861.00	48
CARRIAGE X	1.60	-0.90	3862.00	3872.00	36
CARRIAGE Y	0.30	-1.04	3904.00	3851.00	31
CARRIAGE Z	12.20	-0.29	3893.00	3792.00	1
CARRIAGE Z (SM)	10.45	-0.12	3908.00	3794.00	
CARRIAGE VEL	-1.00	-25.96	4181.00	3863.00	29
SEAT X	1.82	-1.40	3865.00	3870.00	32
SEAT Y	0.77	-0.97	3900.00	3868.00	33
SEAT Z	11.46	-0.24	3900.00	3677.00	34
SEAT Z (SM)	10.42	-0.15	3901.00	3678.00	
CHEST X	3.03	-1.46	3917.00	3945.00	5
CHEST Y	-0.15	-1.66	3944.00	3929.00	5
CHEST Z	19.12	-1.36	3926.00	3823.00	7
CHEST RES	19.21	0.76	3926.00	3859.00	
CHEST SI	27.58		3861.00	3990.00	
HEAD X	.56	-3.95	3999.00	3941.00	2
HEAD Y	1.43	-0.32	4029.00	3911.00	3
HEAD Z	13.56	-0.98	3915.00	3689.00	4
HEAD RES	13.58	0.80	3915.00	3859.00	
HEAD SI	19.71		3869.00	3988.00	
HEAD HIC	16.52		3889.00	3957.00	
SHD REFL LF	70.99	27.43	3935.00	4007.00	14
SHD REEL LF	49.35	11.38	3942.00	3915.00	16
LF SHOULDER	116.10	48.83	3940.00	4032.00	
SHD REFL RT	64.35	26.83	3932.00	4003.00	15
SHD REEL RT	84.46	17.36	3942.00	3914.00	17
RT SHOULDER	142.94	61.93	3941.00	3908.00	
TOTAL SHLD REFL	134.52	55.25	3934.00	4004.00	
TOTAL SHLD REEL	133.82	28.83	3942.00	3914.00	
TOTAL SHOULDER	259.04	117.64	3941.00	4033.00	
TOTAL SHD / WT	1.56	0.71	3941.00	4033.00	
LF LAP BELT	56.22	16.45	4005.00	3905.00	8
RT LAP BELT	75.69	33.04	4004.00	3907.00	9
TOTAL LAP	131.86	50.00	4004.00	3906.00	
TOTAL LAP / WT	0.79	0.30	4004.00	3906.00	
CROTCH STRAP	89.57	-68.46	3999.00	3914.00	10
LF SEAT LNK X	39.45	-233.96	4003.00	3910.00	18
RT SEAT LNK X	37.04	-68.73	3866.00	3908.00	19
TOTAL SEAT X	44.63	-300.22	3860.00	3910.00	
SEAT LNK Y	69.22	-106.31	3979.00	3915.00	35
LF SEAT PAN Z	473.50	28.70	3918.00	3614.00	11
RT SEAT PAN Z	341.49	25.98	3909.00	3652.00	12
CT SEAT PAN Z	857.01	55.69	3918.00	3610.00	13
TOTAL SEAT Z	1664.52	119.97	3918.00	3601.00	
TOTAL SEAT Z / WT	10.03	0.72	3918.00	3601.00	
RES SEAT FORCE	1690.93	128.09	3918.00	3601.00	
RES SEAT FORCE / WT	10.19	0.77	3918.00	3601.00	
LF FOOT X	8.55	-137.01	3864.00	3908.00	20
RT FOOT X	21.55	-78.90	3861.00	3908.00	23
CT FOOT X	52.52	-147.83	3864.00	3908.00	26
TOTAL FOOT X	71.17	-363.74	3864.00	3908.00	
LF FOOT Y	139.77	-20.07	3896.00	4001.00	21
RT FOOT Y	24.74	-121.68	4192.00	3912.00	24
CT FOOT Y	22.39	-54.14	3866.00	3913.00	27
TOTAL FOOT Y	37.98	-72.71	3885.00	3925.00	
LF FOOT Z	225.56	-7.37	3897.00	3994.00	22
RT FOOT Z	162.12	-6.15	3922.00	3874.00	25
CT FOOT Z	178.41	-107.45	3862.00	3854.00	28
TOTAL FOOT Z	425.90	-109.47	3897.00	3854.00	
RES FOOT FORCE	515.42	55.47	3921.00	4123.00	

NEG SHLD HAR ANG TEST: 422 SUBJ: F-2 WT: 161.0 G: 10 GP: 1 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	128.00	167.00	48
CARRIAGE X	1.20	-0.85	3840.00	3809.00	36
CARRIAGE Y	0.56	-0.87	3839.00	3818.00	31
CARRIAGE Z	12.34	-0.15	3833.00	3641.00	1
CARRIAGE Z (SM)	10.52	-0.06	3834.00	3691.00	
CARRIAGE VEL	-0.90	-26.04	4111.00	3799.00	29
SEAT X	1.15	-1.34	3799.00	3848.00	32
SEAT Y	0.84	-1.72	3797.00	3811.00	33
SEAT Z	12.52	-0.22	3840.00	3670.00	34
SEAT Z (SM)	10.66	-0.13	3840.00	3669.00	
CHEST X	3.68	-2.56	3860.00	3886.00	5
CHEST Y	-0.03	-2.04	3820.00	3914.00	6
CHEST Z	22.88	-0.78	3856.00	3673.00	7
CHEST RES	23.17	0.71	3856.00	3791.00	
CHEST SI	38.10		3797.00	3932.00	
HEAD X	1.95	-4.47	3854.00	3887.00	2
HEAD Y	0.78	-1.77	3899.00	3850.00	3
HEAD Z	14.62	-0.78	3854.00	3674.00	4
HEAD RES	14.82	0.56	3854.00	4125.00	
HEAD SI	23.25		3805.00	3954.00	
HEAD HIC	18.36		3833.00	3894.00	
SHD REFL LF	44.59	14.82	3869.00	3945.00	14
SHD REEL LF	62.49	6.41	3888.00	3847.00	16
LF SHOULDER	98.11	26.04	3887.00	3975.00	
SHD REFL RT	64.46	24.93	3873.00	4097.00	15
SHD REEL RT	95.08	9.86	3880.00	3852.00	17
RT SHOULDER	156.48	42.43	3880.00	3846.00	
TOTAL SHLD REFL	107.94	40.94	3871.00	4100.00	
TOTAL SHLD REEL	141.31	16.84	3883.00	3846.00	
TOTAL SHOULDER	240.70	72.54	3881.00	3846.00	
TOTAL SHD / WT	1.50	0.45	3881.00	3846.00	
LF LAP BELT	30.96	7.11	3956.00	3840.00	8
RT LAP BELT	34.80	14.43	3942.00	3843.00	9
TOTAL LAP	62.81	22.38	3947.00	3834.00	
TOTAL LAP / WT	0.39	0.14	3947.00	3834.00	
CROTCH STRAP	156.17	-23.13	3892.00	3851.00	10
LF SEAT LNK X	20.27	-268.10	4177.00	3852.00	18
RT SEAT LNK X	8.62	-130.55	3660.00	3855.00	19
TOTAL SEAT X	11.90	-395.60	3626.00	3853.00	
SEAT LNK Y	54.61	-112.45	3936.00	3852.00	35
LF SEAT PAN Z	504.76	17.53	3857.00	3608.00	11
RT SEAT PAN Z	407.75	8.48	3852.00	3611.00	12
CT SEAT PAN Z	795.21	26.82	3856.00	3636.00	13
TOTAL SEAT Z	1706.14	65.48	3855.00	3611.00	
TOTAL SEAT Z / WT	10.60	0.41	3855.00	3611.00	
RES SEAT FORCE	1754.69	68.86	3855.00	3611.00	
RES SEAT FORCE / WT	10.90	0.43	3855.00	3611.00	
LF FOOT X	1.14	-100.12	3801.00	3849.00	20
RT FOOT X	-4.71	-150.10	3800.00	3851.00	23
CT FOOT X	-22.86	-182.07	3801.00	3851.00	26
TOTAL FOOT X	-30.83	-425.15	3801.00	3850.00	
LF FOOT Y	120.43	-35.92	3836.00	3808.00	21
RT FOOT Y	23.55	-176.12	4039.00	3844.00	24
CT FOOT Y	66.02	-14.08	3875.00	3993.00	27
TOTAL FOOT Y	84.42	-80.63	3815.00	3845.00	
LF FOOT Z	209.04	6.58	3837.00	3794.00	22
RT FOOT Z	201.53	18.96	3844.00	3952.00	25
CT FOOT Z	189.14	-81.82	3843.00	3664.00	28
TOTAL FOOT Z	537.13	-2.50	3844.00	3793.00	
RES FOOT FORCE	616.31	104.25	3844.00	4188.00	

NEG SHLD HAR ANG TEST: 387 SUBJ: G-3 WT: 159.0 G: 10 GP: 2 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.04	9.97	29.00	409.00	48
CARRIAGE X	1.52	-0.88	3841.00	3854.00	36
CARRIAGE Y	0.33	-0.94	3880.00	3979.00	31
CARRIAGE Z	12.32	-0.22	3871.00	3686.00	1
CARRIAGE Z (SM)	10.39	-0.08	3886.00	3796.00	
CARRIAGE VEL	-1.04	-25.85	4191.00	3828.00	29
SEAT X	1.76	-1.29	3842.00	3885.00	32
SEAT Y	1.27	-1.41	3838.00	3844.00	33
SEAT Z	11.59	-0.19	3877.00	3709.00	34
SEAT Z (SM)	10.44	-0.10	3878.00	3707.00	
CHEST X	5.09	-1.93	3895.00	3925.00	5
CHEST Y	-0.40	-3.30	3701.00	3903.00	6
CHEST Z	21.86	-0.91	3905.00	3710.00	7
CHEST RES	22.29	0.69	3904.00	3600.00	
CHEST SI	38.79		3835.00	4083.00	
HEAD X	0.65	-6.27	3698.00	3935.00	2
HEAD Y	1.48	-0.14	3951.00	3920.00	3
HEAD Z	13.02	-1.29	3892.00	3705.00	4
HEAD RES	13.03	0.83	3892.00	4191.00	
HEAD SI	19.41		3845.00	4013.00	
HEAD HIC	14.07		3871.00	3912.00	
SHD REFL LF	66.46	15.39	3918.00	4008.00	14
SHD REEL LF	65.09	2.57	3920.00	3879.00	16
LF SHOULDER	131.24	27.89	3920.00	4007.00	
SHD REFL RT	52.91	22.98	3920.00	3987.00	15
SHD REEL RT	72.27	3.97	3919.00	3874.00	17
RT SHOULDER	125.08	34.13	3920.00	3874.00	
TOTAL SHLD REFL	119.16	42.45	3919.00	3987.00	
TOTAL SHLD REEL	137.25	6.69	3920.00	3873.00	
TOTAL SHOULDER	256.32	65.36	3920.00	3874.00	
TOTAL SHD / WT	1.61	0.41	3920.00	3874.00	
LF LAP BELT	51.56	9.40	3990.00	3881.00	8
RT LAP BELT	54.51	13.17	3986.00	3879.00	9
TOTAL LAP	103.27	23.07	3988.00	3880.00	
TOTAL LAP / WT	0.65	0.15	3988.00	3880.00	
CROTCH STRAP	45.95	-54.45	3933.00	3894.00	10
LF SEAT LNK X	33.06	-193.72	3785.00	3887.00	18
RT SEAT LNK X	15.01	-87.67	3835.00	3893.00	19
TOTAL SEAT X	42.27	-279.54	3778.00	3887.00	
SEAT LNK Y	61.96	-70.60	4089.00	3898.00	35
LF SEAT PAN Z	684.22	56.95	3896.00	3600.00	11
RT SEAT PAN Z	678.57	34.21	3897.00	3606.00	12
CT SEAT PAN Z	478.97	29.18	3896.00	3604.00	13
TOTAL SEAT Z	1841.30	129.65	3896.00	3601.00	
TOTAL SEAT Z / WT	11.58	0.82	3896.00	3601.00	
RES SEAT FORCE	1861.29	133.23	3896.00	3601.00	
RES SEAT FORCE / WT	11.71	0.84	3896.00	3601.00	
LF FOOT X	11.63	-121.28	3844.00	3900.00	20
RT FOOT X	31.70	-93.42	3841.00	3900.00	23
CT FOOT X	54.08	-123.02	3843.00	3900.00	26
TOTAL FOOT X	74.32	-337.72	3842.00	3900.00	
LF FOOT Y	127.82	-20.67	3882.00	3851.00	21
RT FOOT Y	20.29	-104.84	3842.00	3890.00	24
CT FOOT Y	18.65	-75.68	3842.00	3893.00	27
TOTAL FOOT Y	64.09	-77.65	3861.00	3893.00	
LF FOOT Z	139.63	-57.57	3875.00	3833.00	22
RT FOOT Z	170.15	-16.50	3891.00	3859.00	25
CT FOOT Z	154.20	-111.23	3896.00	3852.00	28
TOTAL FOOT Z	370.12	-153.26	3896.00	3852.00	
RES FOOT FORCE	464.89	24.99	3891.00	3965.00	

NEG SHLD HAR ANG TEST: 380 SUBJ: G-2 WT: 120.0 G: 10 GP: 2 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	2845.00	905.00	48
CARRIAGE X	1.20	-1.02	3856.00	3846.00	36
CARRIAGE Y	0.77	-1.00	3853.00	3955.00	31
CARRIAGE Z	12.41	-0.18	3847.00	3763.00	1
CARRIAGE Z (SM)	10.66	-0.10	3847.00	3654.00	
CARRIAGE VEL	-0.91	-25.62	4151.00	3816.00	29
SEAT X	1.36	-1.37	3857.00	3862.00	32
SEAT Y	0.71	-0.80	3967.00	3961.00	33
SEAT Z	11.91	-0.27	3853.00	3663.00	34
SEAT Z (SM)	10.81	-0.17	3854.00	3663.00	
CHEST X	3.85	-2.13	3864.00	3910.00	5
CHEST Y	0.93	-2.42	3886.00	3879.00	6
CHEST Z	22.74	-0.88	3879.00	3786.00	7
CHEST RES	22.87	0.63	3879.00	3726.00	
CHEST SI	35.13		3813.00	4062.00	
HEAD X	0.54	-5.75	3973.00	3910.00	2
HEAD Y	0.83	-0.87	3920.00	3871.00	3
HEAD Z	12.39	-0.90	3868.00	3621.00	4
HEAD RES	12.42	0.40	3868.00	4129.00	
HEAD SI	18.46		3819.00	3943.00	
HEAD HIC	15.33		3842.00	3921.00	
SHD REFL LF	37.27	13.18	3888.00	3956.00	14
SHD REEL LF	45.28	6.43	3903.00	3848.00	16
LF SHOULDER	78.74	24.44	3904.00	3978.00	
SHD REFL RT	37.95	15.70	3911.00	3983.00	15
SHD REEL RT	53.32	2.81	3904.00	3852.00	17
RT SHOULDER	88.38	19.94	3904.00	3986.00	
TOTAL SHLD REFL	72.40	31.40	3897.00	4089.00	
TOTAL SHLD REEL	98.47	9.92	3904.00	3858.00	
TOTAL SHOULDER	167.12	46.43	3904.00	3979.00	
TOTAL SHD / WT	1.39	0.39	3904.00	3979.00	
LF LAP BELT	25.95	2.28	3926.00	3847.00	8
RT LAP BELT	28.92	6.88	3938.00	3850.00	9
TOTAL LAP	54.69	10.05	3938.00	3847.00	
TOTAL LAP / WT	0.46	0.08	3938.00	3847.00	
CROTCH STRAP	41.98	-27.87	3948.00	3868.00	10
LF SEAT LNK X	41.51	-123.11	3969.00	3862.00	18
RT SEAT LNK X	32.97	-42.49	3813.00	3865.00	19
TOTAL SEAT X	49.04	-163.13	3790.00	3862.00	
SEAT LNK Y	56.70	-25.62	3912.00	3864.00	35
LF SEAT PAN Z	355.95	17.04	3865.00	3667.00	11
RT SEAT PAN Z	360.11	15.26	3865.00	3681.00	12
CT SEAT PAN Z	623.02	36.73	3870.00	3652.00	13
TOTAL SEAT Z	1329.03	82.45	3865.00	3667.00	
TOTAL SEAT Z / WT	11.08	0.69	3865.00	3667.00	
RES SEAT FORCE	1338.79	90.65	3865.00	3667.00	
RES SEAT FORCE / WT	11.16	0.76	3865.00	3667.00	
LF FOOT X	15.91	-39.24	3943.00	3863.00	20
RT FOOT X	7.91	-118.98	3810.00	3866.00	23
CT FOOT X	19.32	-103.22	3811.00	3865.00	26
TOTAL FOOT X	24.23	-246.99	3810.00	3865.00	
LF FOOT Y	65.39	-15.84	3850.00	3931.00	21
RT FOOT Y	17.77	-97.60	3629.00	3858.00	24
CT FOOT Y	50.07	-22.91	3862.00	3960.00	27
TOTAL FOOT Y	34.70	-41.51	4013.00	3915.00	
LF FOOT Z	119.82	-23.65	3874.00	3993.00	22
RT FOOT Z	151.38	-20.92	3859.00	3959.00	25
CT FOOT Z	181.70	-53.52	3855.00	3909.00	28
TOTAL FOOT Z	389.29	-68.76	3857.00	3959.00	
RES FOOT FORCE	395.06	7.68	3857.00	4141.00	

NEG SHLD HAR ANG TEST: 371 SUBJ: [illegible] WT: 175.0 G: 10 GP: 2 CELL: [illegible]

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.06	9.97	13.00	389.00	48
CARRIAGE X	1.26	-0.81	3883.00	3882.00	36
CARRIAGE Y	0.42	-0.94	3888.00	3837.00	31
CARRIAGE Z	12.74	-0.71	3882.00	3802.00	1
CARRIAGE Z (SM)	10.69	-0.20	3882.00	3803.00	
CARRIAGE VEL	-1.10	-25.63	4156.00	3842.00	29
SEAT X	1.01	-1.21	3847.00	3897.00	32
SEAT Y	0.86	-1.15	3859.00	3855.00	33
SEAT Z	11.77	-0.31	3888.00	3711.00	34
SEAT Z (SM)	10.55	-0.17	3889.00	3710.00	
CHEST X	6.35	-1.03	3906.00	3945.00	5
CHEST Y	0.12	-1.75	3881.00	3914.00	6
CHEST Z	18.62	-0.81	3915.00	3712.00	7
CHEST RES	19.23	0.58	3915.00	4006.00	
CHEST SI	37.60		3847.00	3997.00	
HEAD X	0.53	-6.03	3699.00	3937.00	2
HEAD Y	1.65	-1.19	3973.00	3903.00	3
HEAD Z	12.31	-1.45	3904.00	3651.00	4
HEAD RES	12.43	1.07	3904.00	4200.00	
HEAD SI	16.85		3861.00	3987.00	
HEAD HIC	13.07		3880.00	3948.00	
SHD REFL LF	35.36	17.67	3913.00	4014.00	14
SHD REEL LF	33.20	4.58	3980.00	3891.00	16
LF SHOULDER	62.35	29.80	3954.00	3884.00	
SHD REFL RT	44.85	12.08	3913.00	3992.00	15
SHD REEL RT	49.95	4.64	3931.00	3888.00	17
RT SHOULDER	82.29	29.68	3928.00	4002.00	
TOTAL SHLD REFL	80.21	33.83	3913.00	3994.00	
TOTAL SHLD REEL	74.81	9.47	3968.00	3890.00	
TOTAL SHOULDER	137.30	66.64	3931.00	3884.00	
TOTAL SHD / WT	0.78	0.38	3931.00	3884.00	
LF LAP BELT	46.98	29.38	3985.00	4075.00	8
RT LAP BELT	56.09	25.55	3984.00	4050.00	9
TOTAL LAP	102.82	55.46	3985.00	4075.00	
TOTAL LAP / WT	0.59	0.32	3985.00	4075.00	
CROTCH STRAP	117.28	-51.40	3978.00	3898.00	10
LF SEAT LNK X	16.07	-215.32	3734.00	3901.00	18
RT SEAT LNK X	4.55	-177.92	3671.00	3904.00	19
TOTAL SEAT X	10.62	-389.61	3702.00	3902.00	
SEAT LNK Y	45.60	-74.85	3967.00	3906.00	35
LF SEAT PAN Z	670.04	42.43	3904.00	3607.00	11
RT SEAT PAN Z	669.31	34.19	3903.00	3610.00	12
CT SEAT PAN Z	739.19	26.23	3906.00	3620.00	13
TOTAL SEAT Z	2064.17	115.55	3906.00	3603.00	
TOTAL SEAT Z / WT	11.80	0.66	3906.00	3603.00	
RES SEAT FORCE	2099.55	115.60	3906.00	3603.00	
RES SEAT FORCE / WT	12.00	0.66	3906.00	3603.00	
LF FOOT X	10.63	-91.53	3845.00	3899.00	20
RT FOOT X	13.02	-90.07	3846.00	3900.00	23
CT FOOT X	34.01	-117.15	3847.00	3900.00	26
TOTAL FOOT X	55.86	-296.95	3846.00	3900.00	
LF FOOT Y	115.42	-19.09	3884.00	4038.00	21
RT FOOT Y	21.12	-134.18	3722.00	3884.00	24
CT FOOT Y	22.37	-55.05	4081.00	3894.00	27
TOTAL FOOT Y	38.79	-57.46	3924.00	3894.00	
LF FOOT Z	130.62	-18.89	3885.00	3840.00	22
RT FOOT Z	165.72	-8.79	3885.00	4146.00	25
CT FOOT Z	164.51	-44.85	3905.00	4004.00	28
TOTAL FOOT Z	431.87	-34.03	3885.00	3840.00	
RES FOOT FORCE	468.29	21.83	3885.00	4116.00	

NEG SHLD HAR ANG TEST: 424 SUBJ: M-2 WT: 163.0 G: 10 GP: 1 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	1821.00	1474.00	48
CARRIAGE X	0.97	-0.95	3867.00	3837.00	36
CARRIAGE Y	0.77	-0.68	3831.00	3836.00	31
CARRIAGE Z	12.25	-0.22	3860.00	3722.00	1
CARRIAGE Z (SM)	10.43	-0.11	3861.00	3757.00	
CARRIAGE VEL	-1.20	-25.85	4184.00	3818.00	29
SEAT X	1.32	-1.17	3830.00	3874.00	32
SEAT Y	0.77	-0.98	3827.00	3834.00	33
SEAT Z	11.97	-0.14	3867.00	3615.00	34
SEAT Z (SM)	10.63	-0.09	3867.00	3717.00	
CHEST X	1.99	-4.10	3867.00	3917.00	5
CHEST Y	0.24	-1.28	3917.00	3848.00	6
CHEST Z	20.08	-0.95	3898.00	3682.00	7
CHEST RES	20.15	0.94	3898.00	3811.00	
CHEST SI	33.38		3827.00	3963.00	
HEAD X	2.16	-5.99	3881.00	3925.00	2
HEAD Y	1.16	-1.89	3951.00	3883.00	3
HEAD Z	11.31	-1.23	3878.00	3646.00	4
HEAD RES	11.63	0.55	3878.00	4148.00	
HEAD SI	15.06		3837.00	4020.00	
HEAD HIC	9.48		3857.00	3901.00	
SHD REFL LF	86.72	24.03	3920.00	3990.00	14
SHD REEL LF	71.06	10.64	3909.00	3872.00	16
LF SHOULDER	149.23	42.20	3911.00	386[illegible]	
SHD REFL RT	58.78	34.12	3910.00	3860.00	15
SHD REEL RT	84.29	12.99	3913.00	3868.[illegible]	17
RT SHOULDER	143.54	48.52	3912.00	3865.00	
TOTAL SHLD REFL	142.92	62.21	3917.00	3990.00	
TOTAL SHLD REEL	152.73	24.30	3911.00	3870.00	
TOTAL SHOULDER	292.51	91.82	3911.00	3863.00	
TOTAL SHD / WT	1.79	0.56	3911.00	3863.00	
LF LAP BELT	36.54	11.47	3974.00	3867.00	8
RT LAP BELT	56.07	19.84	3941.00	3868.00	9
TOTAL LAP	91.44	31.33	3967.00	3868.00	
TOTAL LAP / WT	0.56	0.19	3967.00	3868.00	
CROTCH STRAP	126.53	-45.20	3950.00	3885.00	10
LF SEAT LNK X	44.61	-177.00	4124.00	3876.00	18
RT SEAT LNK X	26.21	-91.31	3831.00	3882.00	19
TOTAL SEAT X	35.57	-267.07	4124.00	3876.00	
SEAT LNK Y	78.45	-56.53	3949.00	3882.00	35
LF SEAT PAN Z	363.10	34.14	3877.00	3774.00	11
RT SEAT PAN Z	403.62	33.58	3877.00	3623.00	12
CT SEAT PAN Z	904.02	72.29	3881.00	3627.00	13
TOTAL SEAT Z	1665.17	150.83	3881.00	3623.00	
TOTAL SEAT Z / WT	10.22	0.93	3881.00	3623.00	
RES SEAT FORCE	1686.06	153.18	3881.00	3623.00	
RES SEAT FORCE / WT	10.34	0.94	3881.00	3623.00	
LF FOOT X	10.79	-57.01	3827.00	3875.00	20
RT FOOT X	-6.78	-130.15	4181.00	3878.00	23
CT FOOT X	0.30	-135.65	3830.00	3877.00	26
TOTAL FOOT X	-14.55	-312.86	3828.00	3878.00	
LF FOOT Y	101.27	-26.26	3862.00	3835.00	21
RT FOOT Y	16.75	-135.88	3740.00	3871.00	24
CT FOOT Y	47.49	-30.83	3899.00	3927.00	27
TOTAL FOOT Y	58.55	-90.77	3843.00	3835.00	
LF FOOT Z	192.38	-25.40	3864.00	3834.00	22
RT FOOT Z	166.41	-5.58	3878.00	3647.00	25
CT FOOT Z	172.21	-78.52	3828.00	3644.00	28
TOTAL FOOT Z	431.83	-24.68	3872.00	3821.00	
RES FOOT FORCE	504.36	63.17	3872.00	3654.00	

NEG SHLD HAR ANG   TEST: 375   SUBJ. [illegible]

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.06	9.97	[illegible]	[illegible]	46
CARRIAGE X	1.95	[illegible]	[illegible]	3802.00	36
CARRIAGE Y	0.46	-1.17	3839.00	3803.00	31
CARRIAGE Z	12.46	[illegible]	[illegible]	[illegible]	[illegible]
CARRIAGE Z (SM)	10.56	[illegible]	[illegible]	3721.00	
CARRIAGE VEL	-1.08	-25.54	[illegible]	3775.00	29
SEAT X	2.27	-1.68	3793.00	[illegible]	32
SEAT Y	0.58	[illegible]	[illegible]	[illegible]	[illegible]
SEAT Z	11.25	-0.24	3825.00	3606.00	34
SEAT Z (SM)	10.36	-0.17	3829.00	3643.00	
CHEST X	5.16	-2.17	3845.00	3870.00	5
CHEST Y	0.23	-1.75	3879.00	3863.00	6
CHEST Z	17.67	-1.02	3858.00	3715.00	7
CHEST RES	17.74	0.43	3858.00	3698.00	
CHEST SI	31.71		3789.00	4015.00	
HEAD X	2.09	-3.43	3849.00	3882.00	2
HEAD Y	1.73	-1.31	3891.00	3855.00	3
HEAD Z	14.37	-1.20	3841.00	3981.00	4
HEAD RES	14.49	0.54	3841.00	3734.00	
HEAD SI	22.92		3797.00	3936.00	
HEAD HIC	17.94		3820.00	3862.00	
SHD REFL LF	39.03	[illegible]	3862.00	4093.00	14
SHD REEL LF	38.36	1.29	3875.00	3826.00	16
LF SHOULDER	69.99	11.41	3875.00	4094.00	
SHD REFL RT	43.35	19.73	3844.00	4100.00	15
SHD REEL RT	42.37	-3.30	3863.00	3977.00	17
RT SHOULDER	75.98	18.09	3862.00	3976.00	
TOTAL SHLD REFL	73.21	26.39	3861.00	4092.00	
TOTAL SHLD REEL	71.71	-1.15	3872.00	3977.00	
TOTAL SHOULDER	133.52	33.20	3865.00	3976.00	
TOTAL SHD / WT	0.95	0.24	3865.00	3976.00	
LF LAP BELT	37.62	12.40	3879.00	3821.00	8
RT LAP BELT	32.43	14.27	3891.00	3831.00	9
TOTAL LAP	69.12	27.22	3879.00	3830.00	
TOTAL LAP / WT	0.49	0.19	3879.00	3830.00	
CROTCH STRAP	118.65	-26.46	4055.00	3844.00	10
LF SEAT LNK X	50.24	-148.92	4052.00	3835.00	18
RT SEAT LNK X	44.66	-120.49	3793.00	3837.00	19
TOTAL SEAT X	44.16	-266.53	4060.00	3837.00	
SEAT LNK Y	57.26	-33.53	3894.00	3834.00	35
LF SEAT PAN Z	340.13	10.37	3839.00	3629.00	11
RT SEAT PAN Z	389.32	6.22	3838.00	3601.00	12
CT SEAT PAN Z	889.95	41.95	3841.00	3636.00	13
TOTAL SEAT Z	1612.33	65.68	3839.00	3601.00	
TOTAL SEAT Z / WT	11.52	0.47	3839.00	3601.00	
RES SEAT FORCE	1634.33	70.37	[illegible]	3601.00	
RES SEAT FORCE / WT	11.67	0.50	3839.00	3601.00	
LF FOOT X	8.36	-136.49	[illegible]	3850.00	20
RT FOOT X	29.03	-82.00	3791.00	3841.00	23
CT FOOT X	31.81	-142.61	3792.00	3840.00	26
TOTAL FOOT X	63.60	-353.10	3792.00	3840.00	
LF FOOT Y	133.33	-19.53	3833.00	3781.00	21
RT FOOT Y	17.22	-139.86	3653.00	3841.00	24
CT FOOT Y	36.76	-42.45	3812.00	3838.00	27
TOTAL FOOT Y	45.77	-65.28	3869.00	3905.00	
LF FOOT Z	154.93	-65.36	3849.00	3801.00	22
RT FOOT Z	162.95	-43.46	3841.00	3783.00	25
CT FOOT Z	204.06	-117.63	3790.00	3805.00	28
TOTAL FOOT Z	445.71	-200.67	3790.00	3783.00	
RES FOOT FORCE	515.64	28.82	3841.00	3616.00	

[illegible]

DATA I[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
10V EXT PWR	[illegible]	[illegible]	[illegible]	[illegible]	
CARRIAGE X	[illegible]	[illegible]	[illegible]	[illegible]	
CARRIAGE Y	[illegible].33	.00	[illegible]	[illegible]	
CARRIAGE Z	[illegible].74	[illegible].27	[illegible]	[illegible]	
CARRIAGE Z (SM)	10.39	[illegible]	[illegible]	[illegible]	
CARRIAGE VEL	-1.[illegible]	[illegible]	[illegible]	[illegible]	
SEAT X	[illegible].90	[illegible]	[illegible]	[illegible]	
SEAT Y	[illegible].33	[illegible]	[illegible]	[illegible]	
SEAT Z	[illegible].54	[illegible]	[illegible]	[illegible]	
SEAT Z (SM)	[illegible].46	[illegible]	3854.[illegible]	[illegible]	
CHEST X	[illegible].76	3.79	3869.[illegible]	[illegible]	
CHEST Y	[illegible].17	[illegible].52	3840.00	3922.[illegible]	
CHEST Z	18.77	[illegible].97	3872.[illegible]	362[illegible].0[illegible]	
CHEST RES	19.07	[illegible].7[illegible]	3872.[illegible]	3840.00	
CHEST SI	39.65		3813.[illegible]	3958.[illegible]	
HEAD X	2.77	3.9[illegible]	386[illegible].[illegible]	3906.[illegible]	
HEAD Y	1.24	0.43	3727.[illegible]	3878.00	
HEAD Z	[illegible].89	-1.42	3859.00	4145.00	
HEAD RES	[illegible]3.11	0.68	3869.00	3819.00	
HEAD SI	[illegible]8.88		3825.00	3975.00	
HEAD HIC	[illegible]4.75		3848.00	3895.00	
SHD REFL LF	51.17	5.4[illegible]	3898.00	4092.00	
SHD REEL LF	49.44	5.05	3304.0[illegible]	[illegible]85[illegible].00	
LF SHOULDER	95.66	[illegible]1.01	3901.00	4093.00	[illegible]
SHD REFL RT	34.07	10.33	3895.00	3962.00	
SHD REEL RT	55.76	2.25	3909.00	3997.00	[illegible]
RT SHOULDER	81.70	[illegible]4.45	3909.00	3944.00	
TOTAL SHLD REFL	84.35	19.50	3897.0[illegible]	3963.00	
TOTAL SHLD REEL	100.75	8.93	3308.00	3852.00	
TOTAL SHOULDER	[illegible]70.31	50.71	3907.00	4083.00	
TOTAL SHO / WT	1.08	0.32	3907.00	4083.00	
LF LAP BELT	43.47	11.16	3971.00	3856.00	
RT LAP BELT	41.50	10.41	3906.00	3850.00	
TOTAL LAP	80.26	22.80	3968.00	3850.00	[illegible]
TOTAL LAP / WT	0.51	0.15	3968.00	3850.00	
CROTCH STRAP	48.60	-36.92	3917.00	3865.00	
LF SEAT LNK X	34.95	-178.02	4097.00	3868.00	8
RT SEAT LNK X	29.27	153.20	3818.00	3869.00	9
TOTAL SEAT X	30.14	-330.65	3751.00	3869.00	
SEAT LNK Y	54.05	-50.06	3929.00	3872.00	[illegible]
LF SEAT PAN Z	451.77	19.81	3871.00	3625.00	11
RT SEAT PAN Z	559.94	21.08	3872.00	3614.00	12
CT SEAT PAN Z	759.67	34.85	3869.00	3628.00	13
TOTAL SEAT Z	1760.95	87.79	3872.00	3614.00	
TOTAL SEAT Z / WT	11.22	0.56	3872.00	3614.00	
RES SEAT FORCE	1789.99	91.56	3872.00	3614.00	
RES SEAT FORCE / WT	11.40	0.58	3872.00	3614.00	
LF FOOT X	7.25	-106.67	3816.00	3866.00	[illegible]
RT FOOT X	10.93	-104.51	3817.00	3876.00	23
CT FOOT X	39.96	-131.77	3817.00	3868.00	26
TOTAL FOOT X	55.43	-334.84	3817.00	3876.00	
LF FOOT Y	115.19	-24.56	3849.00	3923.00	21
RT FOOT Y	24.30	-141.65	3667.00	3850.00	24
CT FOOT Y	44.32	-25.99	3838.00	3935.00	27
TOTAL FOOT Y	62.35	-61.84	3837.00	3867.00	
LF FOOT Z	171.66	-30.93	3850.00	3807.00	22
RT FOOT Z	194.08	-33.79	3867.00	3936.00	25
CT FOOT Z	147.68	-72.45	3881.00	3807.00	28
TOTAL FOOT Z	464.64	-100.99	3850.00	3807.00	
RES FOOT FORCE	504.75	18.32	3850.00	3954.00	

NEG SHLD HAR ANG   TEST: 405   SUBJ: M13   WT: [illegible]   [illegible]   GP: [illegible]   CELL: [illegible]

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.06	9.97	213.00	3436.00	48
CARRIAGE X	1.28	-1.10	3878.00	3891.00	36
CARRIAGE Y	0.33	-1.41	3980.00	3893.00	31
CARRIAGE Z	12.30	-0.23	3910.00	3717.00	1
CARRIAGE Z (SM)	10.43	-0.12	3910.00	3716.00	
CARRIAGE VEL	-1.28	-25.96	4180.00	3881.00	29
SEAT X	1.06	-1.51	3877.00	3923.00	32
SEAT Y	0.97	-1.09	3876.00	3684.00	33
SEAT Z	11.85	-0.34	3916.00	3739.00	34
SEAT Z (SM)	10.66	-0.21	3917.00	3739.00	
CHEST X	3.36	-2.01	3927.00	3974.00	5
CHEST Y	0.37	-4.18	3901.00	3931.00	6
CHEST Z	25.04	-2.46	3936.00	3916.00	7
CHEST RES	25.23	0.66	3936.00	3618.00	
CHEST SI	47.31		3743.00	4016.00	
HEAD X	0.32	-5.38	3629.00	3969.00	2
HEAD Y	1.66	-0.27	4022.00	3964.00	3
HEAD Z	13.15	-1.00	3932.00	3608.00	4
HEAD RES	13.21	0.84	3932.00	3601.00	
HEAD SI	19.61		3883.00	4130.00	
HEAD HIC	14.63		3905.00	3980.00	
SHD REFL LF	56.51	17.04	3967.00	3913.00	14
SHD REEL LF	66.29	4.75	3967.00	3913.00	16
LF SHOULDER	122.80	21.78	3967.00	3913.00	
SHD REFL RT	80.19	28.68	3957.00	3910.00	15
SHD REEL RT	84.26	6.68	3956.00	3925.00	17
RT SHOULDER	164.32	41.61	3956.00	3924.00	
TOTAL SHLD REFL	135.88	46.56	3958.00	3912.00	
TOTAL SHLD REEL	130.38	14.21	3964.00	3925.00	
TOTAL SHOULDER	265.70	65.55	3964.00	3913.00	
TOTAL SHD / WT	1.56	0.39	3964.00	3913.00	
LF LAP BELT	31.91	2.02	4015.00	3916.00	8
RT LAP BELT	30.79	3.78	4098.00	3917.00	9
TOTAL LAP	59.03	5.81	4017.00	3916.00	
TOTAL LAP / WT	0.35	0.03	4017.00	3916.00	
CROTCH STRAP	178.98	6.38	4009.00	3924.00	10
LF SEAT LNK X	32.04	-260.94	4024.00	3925.00	18
RT SEAT LNK X	22.60	-85.64	3882.00	3924.00	19
TOTAL SEAT X	27.29	-344.28	3744.00	3924.00	
SEAT LNK Y	59.55	-123.86	4004.00	3932.00	35
LF SEAT PAN Z	497.22	14.16	3925.00	3621.00	11
RT SEAT PAN Z	311.59	11.10	3925.00	3634.00	12
CT SEAT PAN Z	867.02	33.48	3928.00	3602.00	13
TOTAL SEAT Z	1665.83	74.89	3928.00	3621.00	
TOTAL SEAT Z / WT	9.80	0.44	3928.00	3621.00	
RES SEAT FORCE	1702.18	76.62	3928.00	3621.00	
RES SEAT FORCE / WT	10.01	0.45	3928.00	3621.00	
LF FOOT X	-5.46	-147.41	3878.00	3927.00	20
RT FOOT X	5.16	-106.75	3879.00	3927.00	23
CT FOOT X	-1.63	-162.62	3879.00	3928.00	26
TOTAL FOOT X	-4.64	-414.06	3879.00	3928.00	
LF FOOT Y	144.84	-25.49	3912.00	3766.00	21
RT FOOT Y	25.10	-144.40	3806.00	3911.00	24
CT FOOT Y	33.57	-47.42	3892.00	3922.00	27
TOTAL FOOT Y	59.66	-65.82	3951.00	3922.00	
LF FOOT Z	184.02	9.37	3912.00	3989.00	22
RT FOOT Z	192.24	13.61	3913.00	4029.00	25
CT FOOT Z	172.54	-106.41	3959.00	3624.00	28
TOTAL FOOT Z	484.01	-13.86	3921.00	3869.00	
RES FOOT FORCE	570.14	88.70	3921.00	3880.00	

NEG SHLD HAR RNG TEST: 510 SUBJ: P-3 WT: 200.0 G: 10 GP: 2 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	270.00	490.00	48
CARRIAGE X	1.01	-1.03	3868.00	3862.00	36
CARRIAGE Y	0.88	-0.56	3819.00	3815.00	31
CARRIAGE Z	12.31	-0.30	3862.00	3683.00	1
CARRIAGE Z (SM)	10.25	-0.11	3862.00	3631.00	
CARRIAGE VEL	-0.93	-25.92	4161.00	3818.00	29
SEAT X	1.45	-1.20	3829.00	3876.00	32
SEAT Y	0.73	-1.28	3841.00	3832.00	33
SEAT Z	11.72	-0.16	3869.00	3675.00	34
SEAT Z (SM)	10.52	-0.08	3869.00	3677.00	
CHEST X	5.14	-0.55	3885.00	3919.00	5
CHEST Y	-0.38	-2.51	3834.00	3890.00	6
CHEST Z	19.48	-0.94	3693.00	3791.00	7
CHEST RES	20.04	0.62	3893.00	3822.00	
CHEST SI	34.76		3825.00	4076.00	
HEAD X	.76	-4.30	3845.00	3907.00	2
HEAD Y	1.43	0.26	4033.00	3948.00	3
HEAD Z	12.43	-1.19	3879.00	3806.00	4
HEAD RES	12.47	0.74	3879.00	3830.00	
HEAD SI	18.70		3835.00	3961.00	
HEAD HIC	15.70		3856.00	3922.00	
SHD REFL LF	57.18	24.54	3900.00	4100.00	14
SHD REEL LF	56.30	12.68	3910.00	3880.00	16
LF SHOULDER	108.85	48.43	3909.00	3974.00	
SHD REFL RT	56.04	20.95	3908.00	4002.00	15
SHD REEL RT	53.67	5.88	3917.00	3878.00	17
RT SHOULDER	108.59	47.14	3911.00	4007.00	
TOTAL SHLD REFL	109.74	51.14	3900.00	3991.00	
TOTAL SHLD REEL	109.72	19.23	3911.00	3879.00	
TOTAL SHOULDER	216.66	99.35	3910.00	3998.00	
TOTAL SHD / WT	1.08	0.50	3910.00	3998.00	
LF LAP BELT	70.96	20.78	3966.00	3886.00	8
RT LAP BELT	72.01	24.54	3960.00	3882.00	9
TOTAL LAP	139.43	46.52	3962.00	3884.00	
TOTAL LAP / WT	0.70	0.23	3962.00	3884.00	
CROTCH STRAP	211.79	34.52	4065.00	3881.00	10
LF SEAT LNK X	53.84	-230.76	4140.00	3880.00	18
RT SEAT LNK X	25.16	-127.94	3935.00	3877.00	19
TOTAL SEAT X	51.84	-358.13	4115.00	3877.00	
SEAT LNK Y	61.42	-89.28	4053.00	3876.00	35
LF SEAT PAN Z	494.21	40.59	3886.00	3608.00	11
RT SEAT PAN Z	569.64	44.68	3885.00	3630.00	12
CT SEAT PAN Z	1097.27	94.49	3881.00	3603.00	13
TOTAL SEAT Z	2146.80	191.78	3886.00	3603.00	
TOTAL SEAT Z / WT	10.73	0.96	3886.00	3603.00	
RES SEAT FORCE	2175.70	192.97	3880.00	3603.00	
RES SEAT FORCE / WT	10.88	0.96	3880.00	3603.00	
LF FOOT X	2.57	-144.80	3828.00	3879.00	20
RT FOOT X	21.31	-80.91	3827.00	3889.00	23
CT FOOT X	0.34	-218.79	3828.00	3889.00	26
TOTAL FOOT X	18.05	-433.66	3828.00	3889.00	
LF FOOT Y	126.48	-14.15	3864.00	3954.00	21
RT FOOT Y	18.57	-104.79	3914.00	3872.00	24
CT FOOT Y	16.04	-59.61	3849.00	3883.00	27
TOTAL FOOT Y	47.05	-52.35	3847.00	3883.00	
LF FOOT Z	196.02	-3.23	3889.00	3819.00	22
RT FOOT Z	228.66	-3.37	3888.00	3847.00	25
CT FOOT Z	151.90	-73.53	3885.00	3820.00	28
TOTAL FOOT Z	505.08	-55.78	3888.00	3820.00	
RES FOOT FORCE	664.38	59.01	3889.00	4149.00	

NEG SHLD HAR ANG TEST: 370 SUBJ: A-1 WT: 194.0 G: 10 GP: 2 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.06	9.97	11.00	2813.00	48
CARRIAGE X	1.56	-1.19	3830.00	3824.00	36
CARRIAGE Y	0.86	-1.02	3830.00	3935.00	31
CARRIAGE Z	13.06	-0.34	3825.00	3608.00	1
CARRIAGE Z (SM)	10.71	-0.10	3825.00	3632.00	
CARRIAGE VEL	-0.98	-25.75	4102.00	3790.00	29
SEAT X	1.36	-1.72	3829.00	3824.00	32
SEAT Y	0.93	-1.60	3785.00	3794.00	33
SEAT Z	11.69	-0.31	3832.00	3657.00	34
SEAT Z (SM)	10.69	-0.19	3832.00	3643.00	
CHEST X	6.35	-0.94	3851.00	3901.00	5
CHEST Y	-0.46	-3.26	3955.00	3868.00	6
CHEST Z	16.50	-1.00	3863.00	3645.00	7
CHEST RES	17.39	1.05	3861.00	3745.00	
CHEST SI	33.06		3795.00	3911.00	
HEAD X	2.68	-3.84	3839.00	3880.00	2
HEAD Y	0.66	-1.16	3687.00	3847.00	3
HEAD Z	12.31	-0.79	3851.00	3655.00	4
HEAD RES	12.50	0.35	3848.00	4074.00	
HEAD SI	21.28		3795.00	4052.00	
HEAD HIC	17.09		3823.00	3888.00	
SHD REFL LF	71.44	14.54	3861.00	4092.00	14
SHD REEL LF	75.12	13.10	3903.00	3837.00	16
LF SHOULDER	125.86	46.42	3864.00	4092.00	
SHD REFL RT	43.43	13.44	3865.00	3955.00	15
SHD REEL RT	64.36	1.82	3913.00	3834.00	17
RT SHOULDER	97.73	22.10	3912.00	3825.00	
TOTAL SHLD REFL	114.14	32.95	3862.00	4100.00	
TOTAL SHLD REEL	133.12	15.50	3910.00	3835.00	
TOTAL SHOULDER	212.68	72.58	3910.00	3827.00	
TOTAL SHD / WT	1.10	0.37	3910.00	3827.00	
LF LAP BELT	65.20	44.68	3867.00	3835.00	8
RT LAP BELT	75.76	46.80	3892.00	4099.00	9
TOTAL LAP	135.70	93.58	3892.00	3834.00	
TOTAL LAP / WT	0.70	0.48	3892.00	3834.00	
CROTCH STRAP	140.71	-111.74	3918.00	3857.00	10
LF SEAT LNK X	44.85	-135.89	3939.00	3845.00	18
RT SEAT LNK X	11.78	-163.69	3791.00	3847.00	19
TOTAL SEAT X	35.35	-296.68	4070.00	3845.00	
SEAT LNK Y	34.96	-30.41	4115.00	3800.00	35
LF SEAT PAN Z	424.36	28.98	3849.00	3656.00	11
RT SEAT PAN Z	686.12	57.02	3846.00	3600.00	12
CT SEAT PAN Z	797.90	59.88	3848.00	3611.00	13
TOTAL SEAT Z	1896.12	159.50	3848.00	3600.00	
TOTAL SEAT Z / WT	9.77	0.82	3848.00	3600.00	
RES SEAT FORCE	1918.20	159.64	3848.00	3600.00	
RES SEAT FORCE / WT	9.89	0.82	3848.00	3600.00	
LF FOOT X	-32.19	-220.24	3609.00	3840.00	20
RT FOOT X	-26.81	-193.35	3678.00	3842.00	23
CT FOOT X	-58.76	-273.42	3787.00	3843.00	26
TOTAL FOOT X	-159.61	-677.09	3787.00	3842.00	
LF FOOT Y	189.61	-25.26	3827.00	4085.00	21
RT FOOT Y	33.65	-191.76	3638.00	3835.00	24
CT FOOT Y	25.04	-43.48	3943.00	3837.00	27
TOTAL FOOT Y	48.47	-62.09	3869.00	3846.00	
LF FOOT Z	314.87	33.27	3826.00	3965.00	22
RT FOOT Z	262.70	47.59	3835.00	4183.00	25
CT FOOT Z	148.80	-117.42	3834.00	3799.00	28
TOTAL FOOT Z	622.76	34.37	3835.00	3797.00	
RES FOOT FORCE	838.06	194.89	3844.00	4198.00	

NEG SHLD HAR ANG TEST: 392 SUBJ: R-2 WT: 146.0 G: 10 GP: 1 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.04	9.96	1457.00	1428.00	48
CARRIAGE X	1.38	-1.10	3828.00	3820.00	36
CARRIAGE Y	0.79	-0.72	3826.00	3771.00	31
CARRIAGE Z	12.73	-0.17	3821.00	3605.00	1
CARRIAGE Z (SM)	10.71	-0.10	3821.00	3629.00	
CARRIAGE VEL	-0.96	-25.67	4126.00	3786.00	29
SEAT X	1.13	-1.60	3782.00	3820.00	32
SEAT Y	0.59	-0.74	3782.00	3845.00	33
SEAT Z	11.89	-0.24	3828.00	3659.00	34
SEAT Z (SM)	10.77	-0.11	3829.00	3646.00	
CHEST X	5.69	-0.79	3840.00	3882.00	5
CHEST Y	1.06	-2.38	3834.00	3856.00	6
CHEST Z	18.25	-1.26	3856.00	3690.00	7
CHEST RES	18.75	0.28	3857.00	3780.00	
CHEST SI	32.99		3785.00	3924.00	
HEAD X	.32	-4.49	3637.00	3881.00	2
HEAD Y	1.14	-1.16	3909.00	3841.00	3
HEAD Z	14.21	-0.76	3839.00	3603.00	4
HEAD RES	14.41	0.37	3839.00	4182.00	
HEAD SI	20.90		3793.00	4052.00	
HEAD HIC	14.43		3818.00	3861.00	
SHD REFL LF	33.01	11.48	3869.00	4094.00	14
SHD REEL LF	27.90	5.96	3929.00	3828.00	16
LF SHOULDER	51.99	26.29	3869.00	4100.00	
SHD REFL RT	32.39	15.15	3860.00	4062.00	15
SHD REEL RT	40.12	1.59	3875.00	3829.00	17
RT SHOULDER	69.06	25.32	3873.00	3825.00	
TOTAL SHLD REFL	65.21	28.19	3849.00	4080.00	
TOTAL SHLD REEL	62.10	7.66	3876.00	3828.00	
TOTAL SHOULDER	120.70	53.70	3869.00	3823.00	
TOTAL SHD / WT	0.83	0.37	3869.00	3823.00	
LF LAP BELT	34.00	0.00	3933.00	3834.00	8
RT LAP BELT	39.74	4.75	3934.00	3829.00	9
TOTAL LAP	73.47	7.57	3933.00	3832.00	
TOTAL LAP / WT	0.50	0.05	3933.00	3832.00	
CROTCH STRAP	28.20	-34.16	3915.00	3846.00	10
LF SEAT LNK X	54.82	-119.01	3936.00	3838.00	18
RT SEAT LNK X	52.35	-53.42	3792.00	3837.00	19
TOTAL SEAT X	77.04	-171.85	3894.00	3837.00	
SEAT LNK Y	71.21	-8.09	3888.00	3795.00	35
LF SEAT PAN Z	274.53	11.26	3837.00	3602.00	11
RT SEAT PAN Z	340.17	6.00	3847.00	3651.00	12
CT SEAT PAN Z	979.76	76.80	3839.00	3653.00	13
TOTAL SEAT Z	1579.04	106.76	3839.00	3602.00	
TOTAL SEAT Z / WT	10.82	0.73	3839.00	3602.00	
RES SEAT FORCE	1587.72	115.40	3839.00	3649.00	
RES SEAT FORCE / WT	10.87	0.79	3839.00	3649.00	
LF FOOT X	-5.17	-175.15	3675.00	3839.00	20
RT FOOT X	9.52	-124.42	3787.00	3838.00	23
CT FOOT X	1.31	-195.47	4200.00	3839.00	26
TOTAL FOOT X	1.18	-495.03	3787.00	3839.00	
LF FOOT Y	147.70	-16.51	3833.00	4026.00	21
RT FOOT Y	22.75	-129.00	3891.00	3822.00	24
CT FOOT Y	16.66	-53.65	3789.00	3842.00	27
TOTAL FOOT Y	59.64	-62.77	3814.00	3842.00	
LF FOOT Z	188.53	-6.72	3849.00	3916.00	22
RT FOOT Z	196.30	-7.42	3850.00	3798.00	25
CT FOOT Z	130.90	-91.00	3831.00	3778.00	28
TOTAL FOOT Z	430.27	-67.71	3849.00	3778.00	
RES FOOT FORCE	585.77	22.88	3841.00	3925.00	

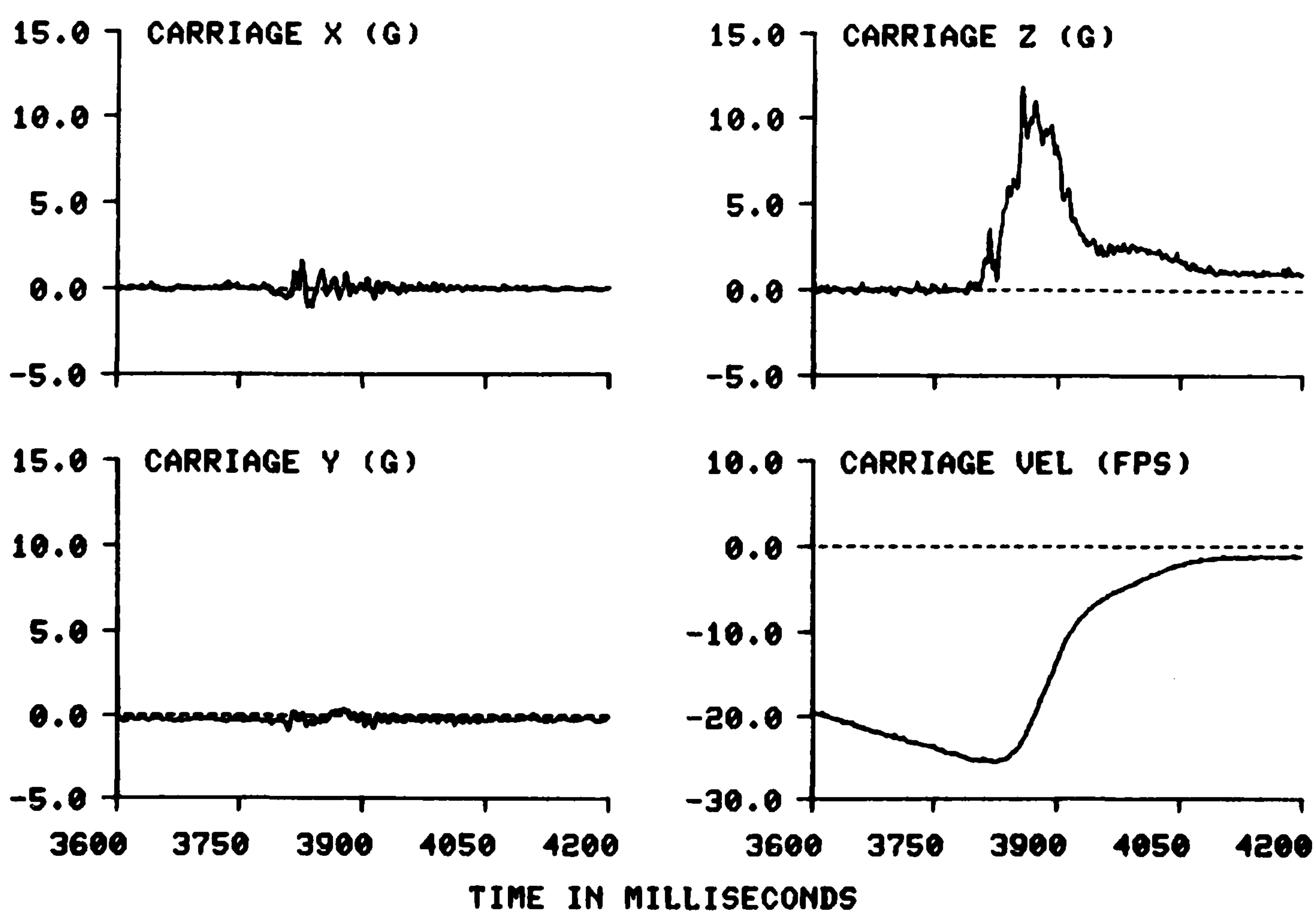
NEG SHLD HAR ANG   TEST: 400   SUBJ: R-3   WT: 146.0   G: 10   GP: 2   CELL: [illegible]

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.9[illegible]	1308.00	2156.00	48
CARRIAGE X	1.52	[illegible]	3864.00	3870.00	36
CARRIAGE Y	0.4[illegible]	[illegible].74	[illegible]903.00	3870.00	31
CARRIAGE Z	12.[illegible]	[illegible].26	3893.00	365[illegible].00	[illegible]
CARRIAGE Z [illegible]	10.41	[illegible]	3908.00	3604.00	
CARRIAGE VE[illegible]	-1.15	25.55	4119.00	3859.00	29
SEAT X	1.30	-1.66	3865.00	3871.00	32
SEAT Y	0.80	-1.36	3909.00	3914.00	33
SEAT Z	11.94	0.21	3900.00	3659.00	34
SEAT Z (SM)	10.65	-0.15	3900.00	3696.00	
CHEST X	5.12	-1.98	3918.00	3954.00	5
CHEST Y	0.86	-2.04	3896.00	3908.00	6
CHEST Z	16.92	1.31	3932.00	3698.00	7
CHEST RES	17.30	[illegible]	3932.00	3711.00	
CHEST SI	27.34		3857.00	4000.00	
HEAD X	0.70	[illegible].39	3859.00	3957.00	2
HEAD Y	1.36	[illegible]	3988.00	3927.00	3
HEAD Z	13.32	[illegible].31	3917.00	3527.00	4
HEAD RES	13.33	[illegible]	3917.00	4198.00	
HEAD SI	19.22		3867.00	4061.00	
HEAD HIC	12.69		3889.00	3935.00	
SHD REFL LF	64.04	20.65	3948.00	4027.00	14
SHD REEL LF	49.27	2.00	3951.00	3895.00	16
LF SHOULDER	112.33	33.49	3950.00	4026.00	
SHD REFL RT	48.32	22.66	3944.00	4027.00	15
SHD REEL RT	67.03	11.65	3948.00	3909.00	17
RT SHOULDER	114.00	46.3[illegible]	3946.00	4043.00	
TOTAL SHLD REFL	110.82	43.31	3947.00	4027.00	
TOTAL SHLD REEL	114.97	[illegible]	[illegible]	[illegible]	
TOTAL SHOULDER	224.50	83.[illegible]	[illegible]	4032.[illegible]	
TOTAL SHD / WT	1.54	0.5[illegible]	3948.00	4032.00	
LF LAP BELT	56.90	16.65	3993.00	3909.00	8
RT LAP BELT	68.34	25.54	3993.00	3902.00	9
TOTAL LAP	125.24	43.92	3993.00	3903.00	
TOTAL LAP / WT	0.86	0.30	3993.00	3903.00	
CROTCH STRAP	34.06	50.85	3996.00	3893.00	10
LF SEAT LNK X	50.51	140.58	4145.00	3911.00	18
RT SEAT LNK X	19.93	-73.47	3981.00	3910.00	19
TOTAL SEAT X	56.90	-213.48	3995.00	3910.00	
SEAT LNK Y	66.79	-82.11	3977.00	3915.00	35
LF SEAT PAN Z	420.16	32.04	3913.00	3608.00	11
RT SEAT PAN Z	417.09	46.04	3910.00	3624.00	12
CT SEAT PAN Z	732.72	67.24	3914.00	3619.00	13
TOTAL SEAT Z	1554.18	162.18	3912.00	3624.00	
TOTAL SEAT Z / WT	10.65	1.11	3912.00	3624.00	
RES SEAT FORCE	1570.47	164.80	3912.00	3624.00	
RES SEAT FORCE / WT	10.76	1.13	3912.00	3624.00	
LF FOOT X	9.38	-98.21	3865.00	3911.00	20
RT FOOT X	14.82	-72.41	3899.00	3912.00	23
CT FOOT X	62.66	-130.53	3866.00	3912.00	26
TOTAL FOOT X	74.44	-300.25	3866.00	3912.00	
LF FOOT Y	115.05	-21.21	3896.00	4004.00	21
RT FOOT Y	28.56	-110.77	3961.00	3904.00	24
CT FOOT Y	25.72	-63.28	3946.00	3906.00	27
TOTAL FOOT Y	85.74	-80.70	3883.00	3923.00	
LF FOOT Z	194.45	-57.03	3920.00	3867.00	22
RT FOOT Z	162.35	30.80	3912.00	3865.00	25
CT FOOT Z	135.98	-90.57	3898.00	3874.00	28
TOTAL FOOT Z	423.95	-50.48	3920.00	3980.00	
RES FOOT FORCE	481.05	7.92	3920.00	3614.00	

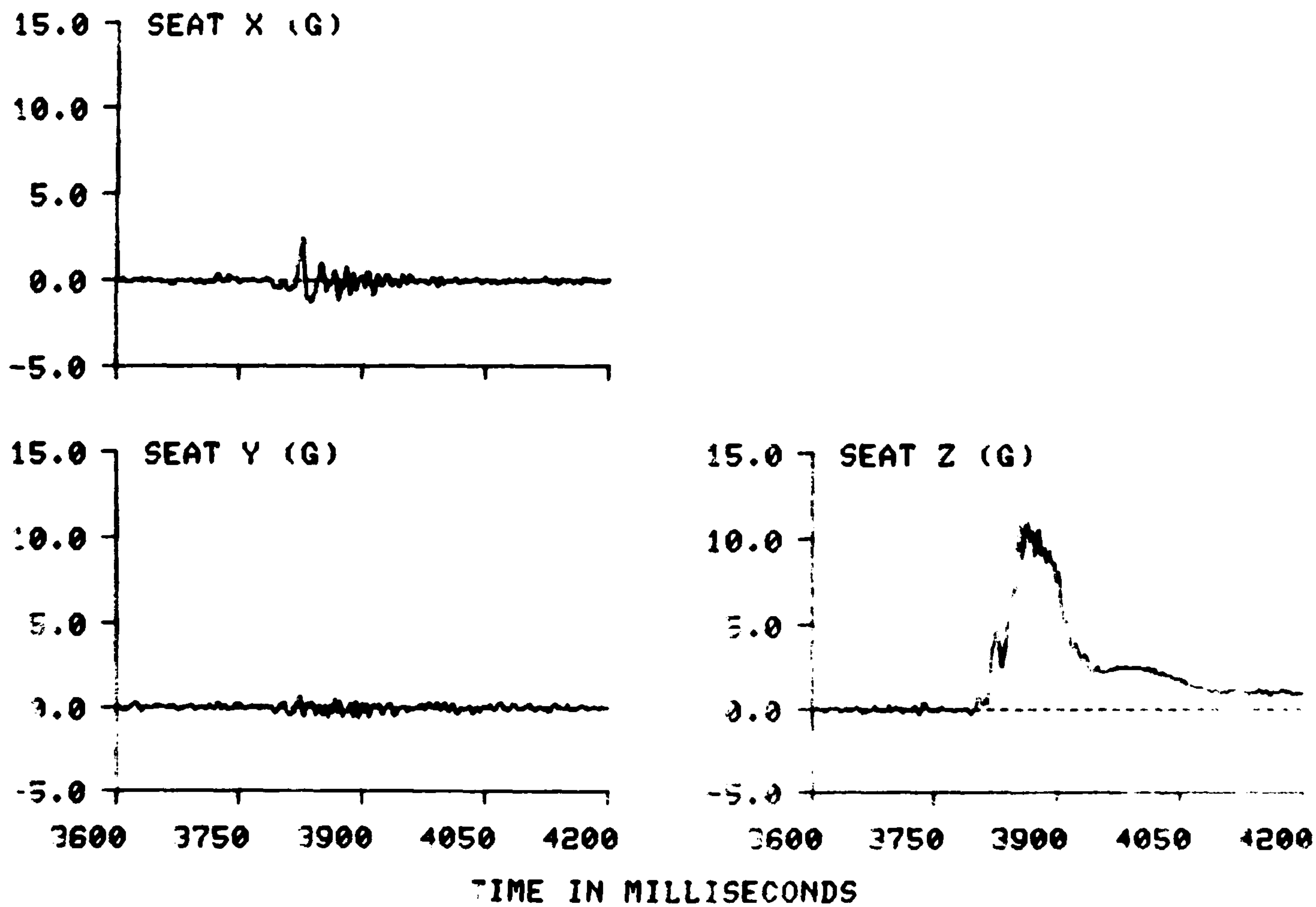
NEG SHLD HAR ANG   TEST: 394   SUB.: S-3   WT: 165.0   G: 10   SP: 2   CELL: C

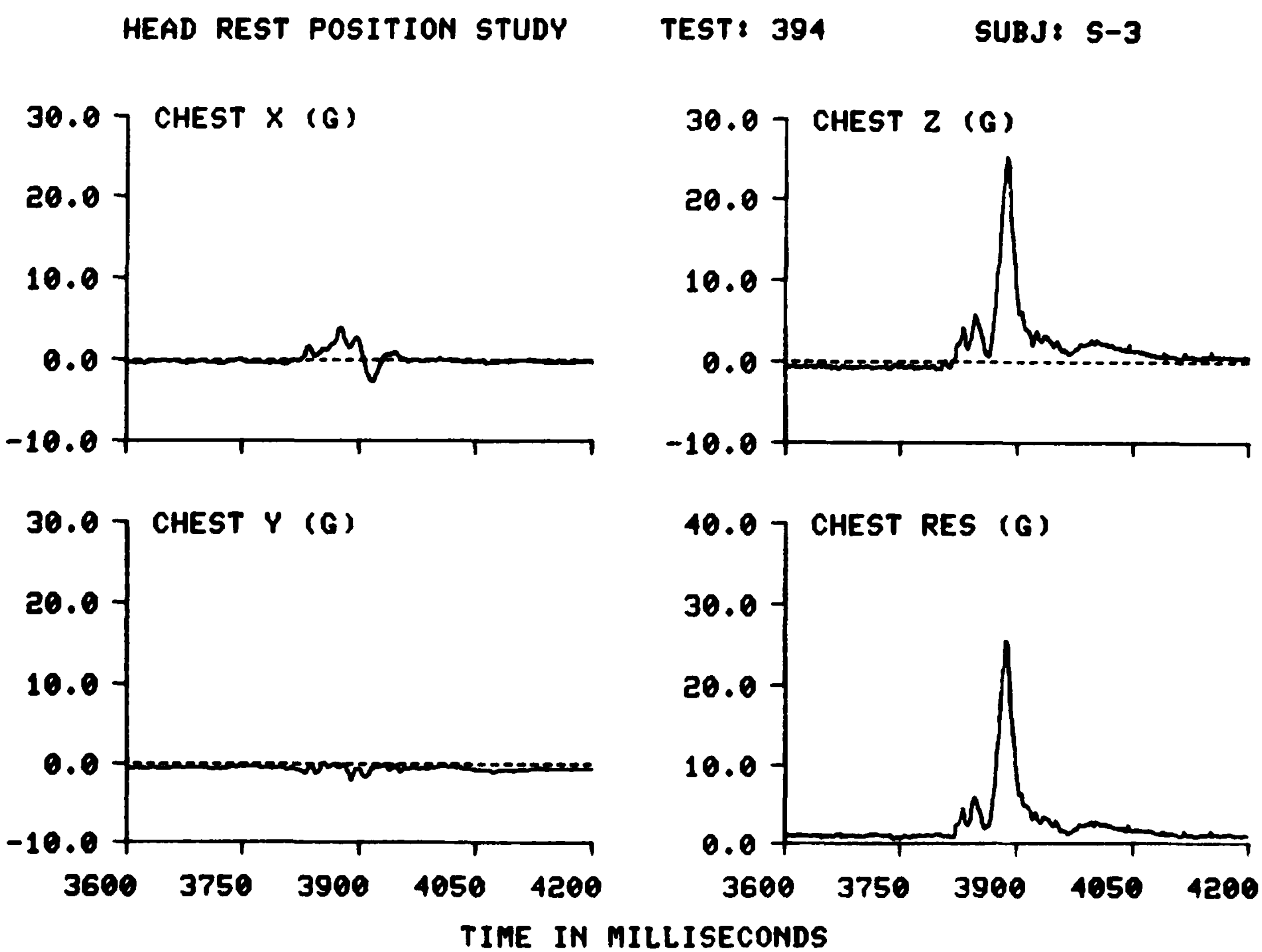
DATA ID	MAX	MIN	T1	T2	CH
IOV EXT PWR	10.05	9.97	[illegible]439.00	3431.00	48
CARRIAGE X	1.63	-1.11	3825.00	3838.00	36
CARRIAGE Y	0.37	-0.95	3877.00	3809.00	31
CARRIAGE Z	11.84	-0.31	3856.00	3702.00	1
CARRIAGE Z (SM)	10.37	-0.18	3857.00	3700.00	
CARRIAGE VEL	-1.03	-25.55	4149.00	3820.00	29
SEAT X	2.46	-1.32	3825.00	3837.00	32
SEAT Y	0.68	-0.65	3824.00	3896.00	33
SEAT Z	11.09	-0.31	3863.00	3795.00	34
SEAT Z (SM)	10.39	-0.18	3864.00	3664.00	
CHEST X	3.97	-2.62	3875.00	3917.00	5
CHEST Y	0.11	-2.16	3855.00	3890.00	6
CHEST Z	25.39	-0.98	3887.00	3668.00	7
CHEST RES	25.49	0.51	3887.00	3743.00	
CHEST SI	13.06		3821.00	3966.00	
HEAD X	2.17	-4.02	3877.00	3917.00	2
HEAD Y	1.25	-0.10	3836.00	3893.00	3
HEAD Z	13.69	-1.24	3877.00	3609.00	4
HEAD RES	13.87	0.57	3877.00	4200.00	
HEAD SI	18.79		3831.00	3952.00	
HEAD HIC	14.14		3853.00	3898.00	
SHD REFL LF	60.02	11.44	3903.00	4082.00	14
SHD REEL LF	47.86	8.53	3909.00	3870.00	16
LF SHOULDER	104.16	31.97	3906.00	4098.00	
SHD REFL RT	47.02	18.38	3903.00	3960.00	15
SHD REEL RT	69.48	1.60	3913.00	3870.00	17
RT SHOULDER	109.68	25.31	3912.00	3989.00	
TOTAL SHLD REFL	107.03	35.35	3903.00	4098.00	
TOTAL SHLD REEL	115.46	10.13	3912.00	3870.00	
TOTAL SHOULDER	209.19	72.55	3911.00	3990.00	
TOTAL SHD / WT	1.27	0.44	3911.00	3990.00	
LF LAP BELT	41.81	16.60	3911.00	3876.00	8
RT LAP BELT	60.61	30.98	3920.00	3860.00	9
TOTAL LAP	101.50	49.12	3920.00	3859.00	
TOTAL LAP / WT	0.62	0.30	3920.00	3859.00	
CROTCH STRAP	77.82	-66.22	3959.00	3871.00	10
LF SEAT LNK X	48.72	-165.40	3961.00	3871.00	18
RT SEAT LNK X	25.89	-147.30	3826.00	3872.00	19
TOTAL SEAT X	27.90	-311.47	4085.00	3871.00	
SEAT LNK Y	82.30	-38.16	3942.00	3876.00	35
LF SEAT PAN Z	406.35	31.74	3872.00	3789.00	11
RT SEAT PAN Z	488.73	41.84	3887.00	3643.00	12
CT SEAT PAN Z	637.50	53.51	3874.00	3600.00	13
TOTAL SEAT Z	1689.28	143.25	3873.00	3612.00	
TOTAL SEAT Z / WT	10.24	0.87	3873.00	3612.00	
RES SEAT FORCE	1716.92	144.47	3873.00	3612.00	
RES SEAT FORCE / WT	10.41	0.88	3873.00	3612.00	
LF FOOT X	14.57	-95.79	3827.00	3874.00	20
RT FOOT X	15.67	-46.01	3619.00	3884.00	23
CT FOOT X	55.87	-165.06	3828.00	3871.00	26
TOTAL FOOT X	68.43	-282.10	3827.00	3874.00	
LF FOOT Y	79.38	-20.19	3848.00	3834.00	21
RT FOOT Y	27.08	-82.96	3907.00	3874.00	24
CT FOOT Y	30.40	-79.06	3827.00	3889.00	27
TOTAL FOOT Y	58.72	-92.20	3847.00	3877.00	
LF FOOT Z	151.58	-56.62	3849.00	3890.00	22
RT FOOT Z	109.69	-135.22	3824.00	3855.00	25
CT FOOT Z	390.19	-117.98	3880.00	3837.00	28
TOTAL FOOT Z	446.70	-196.21	3849.00	3837.00	
RES FOOT FORCE	82.06	3.21	3875.00	3773.00	

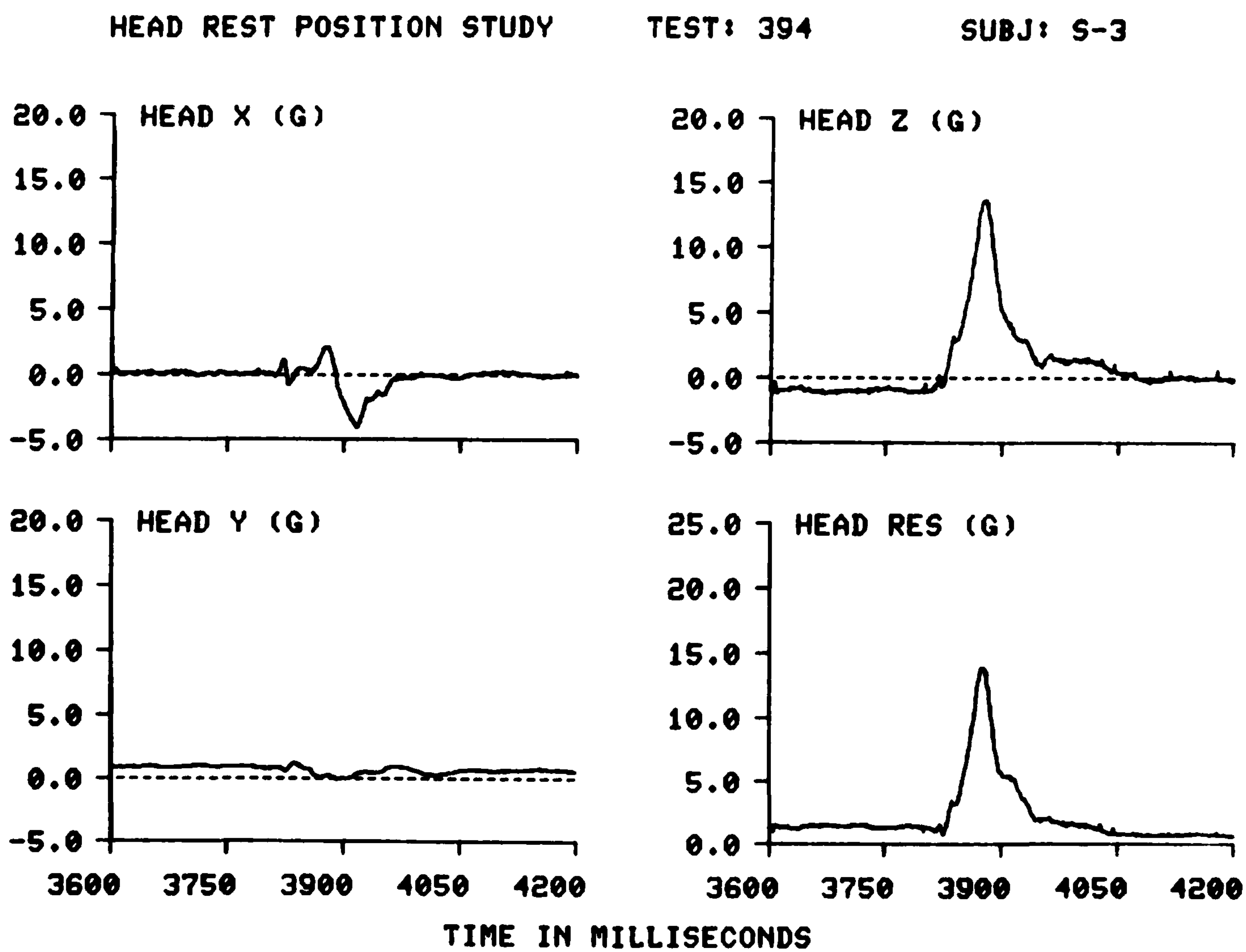
HEAD REST POSITION STUDY TEST: 394 SUBJ: S-3



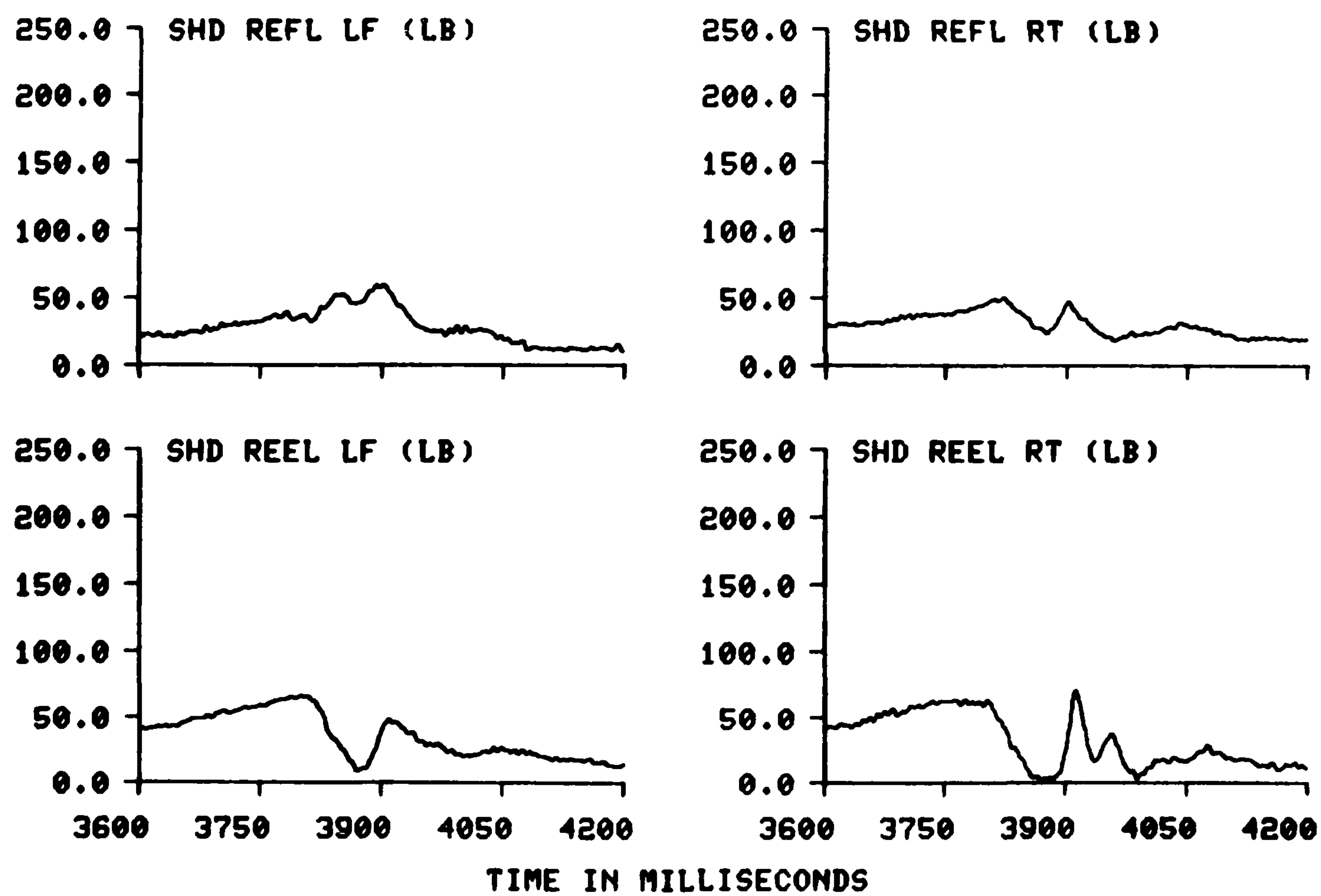
HEAD REST POSITION STUDY TEST: 394 SUBJ: S-3



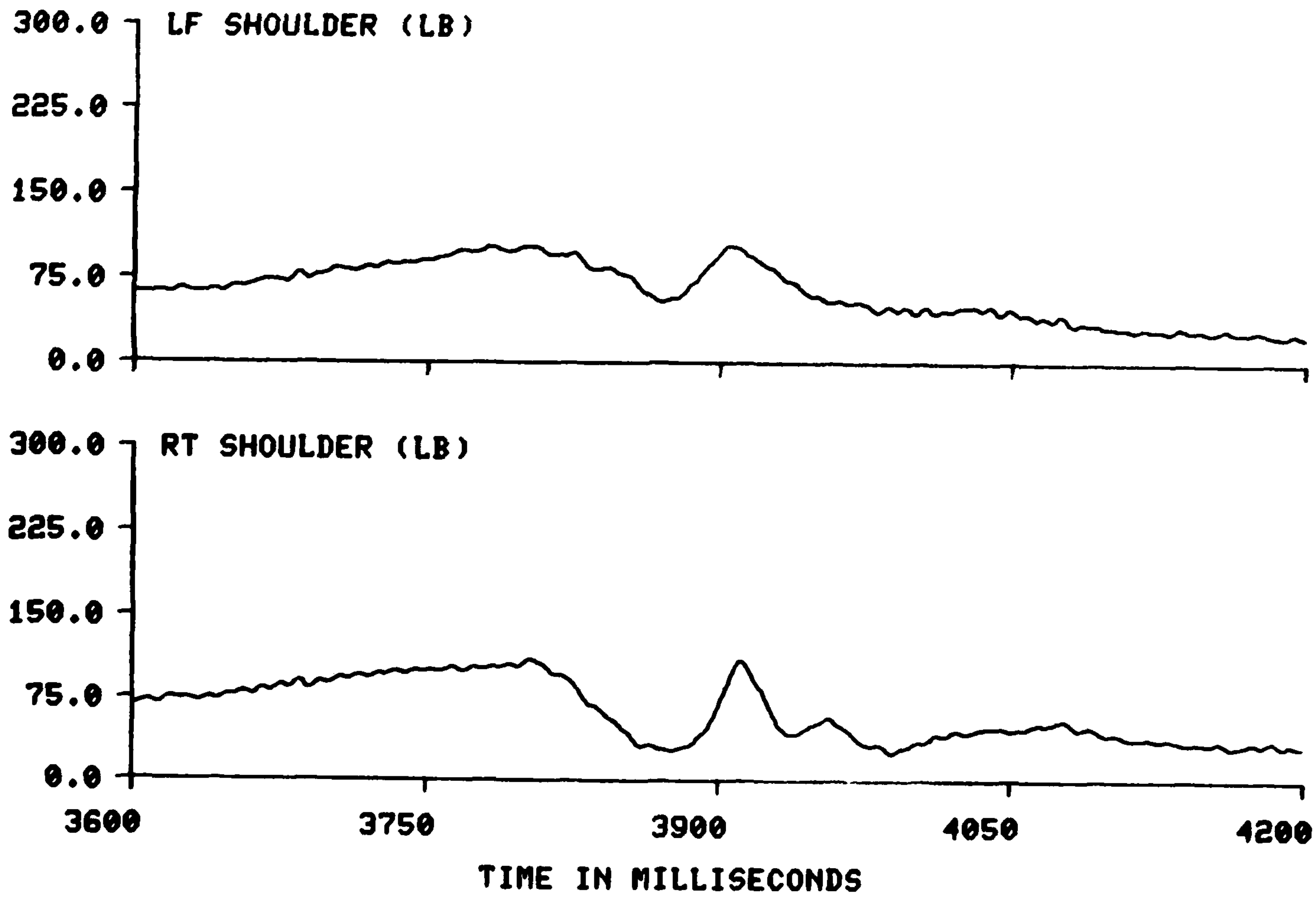

HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
CHEST X (G)
CHEST Z (G)
CHEST Y (G)
CHEST RES (G)
30.0
20.0
10.0
0.0
-10.0
40.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

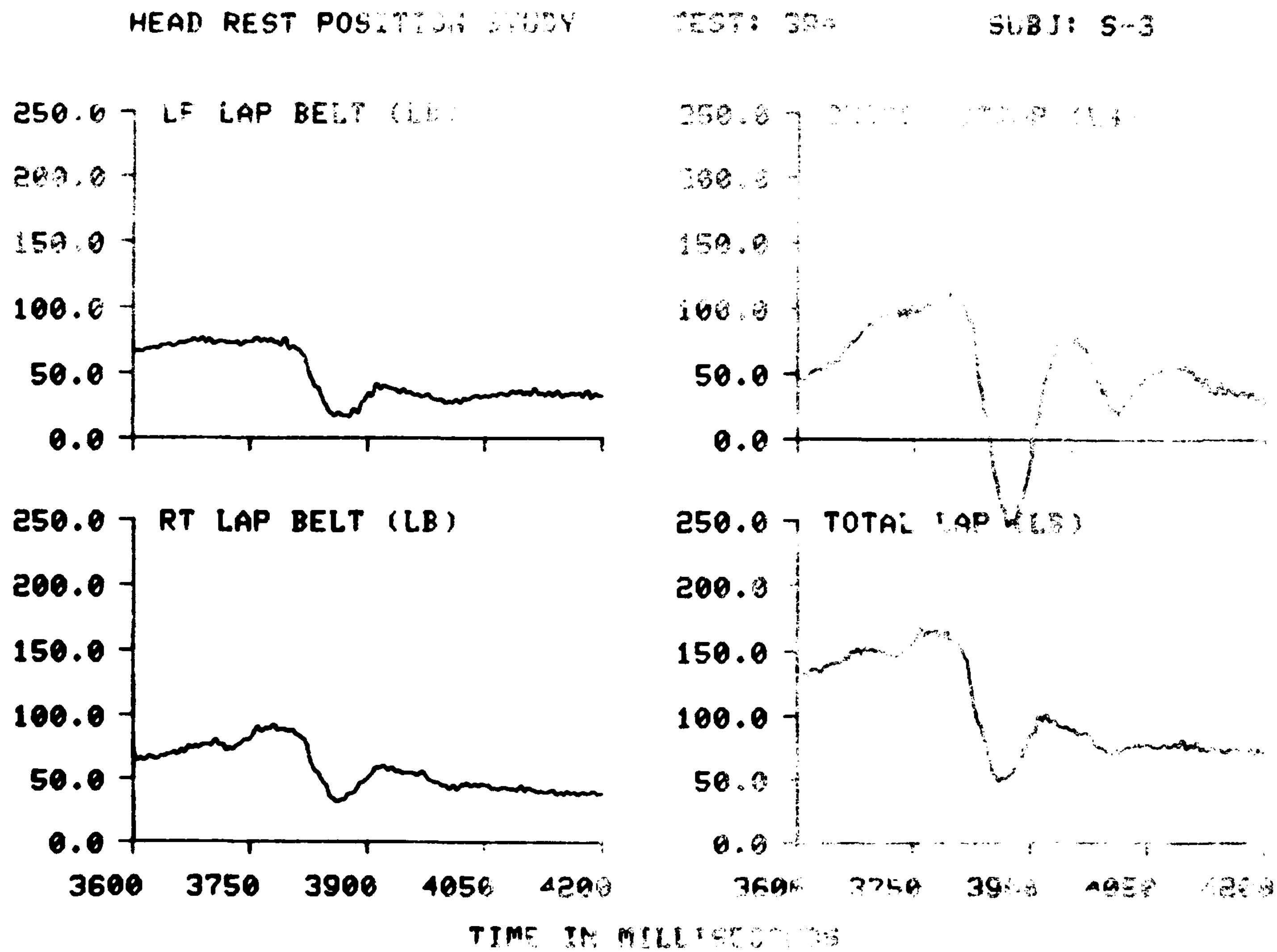

HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
HEAD X (G)
HEAD Z (G)
HEAD Y (G)
HEAD RES (G)
20.0
15.0
10.0
5.0
0.0
-5.0
25.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

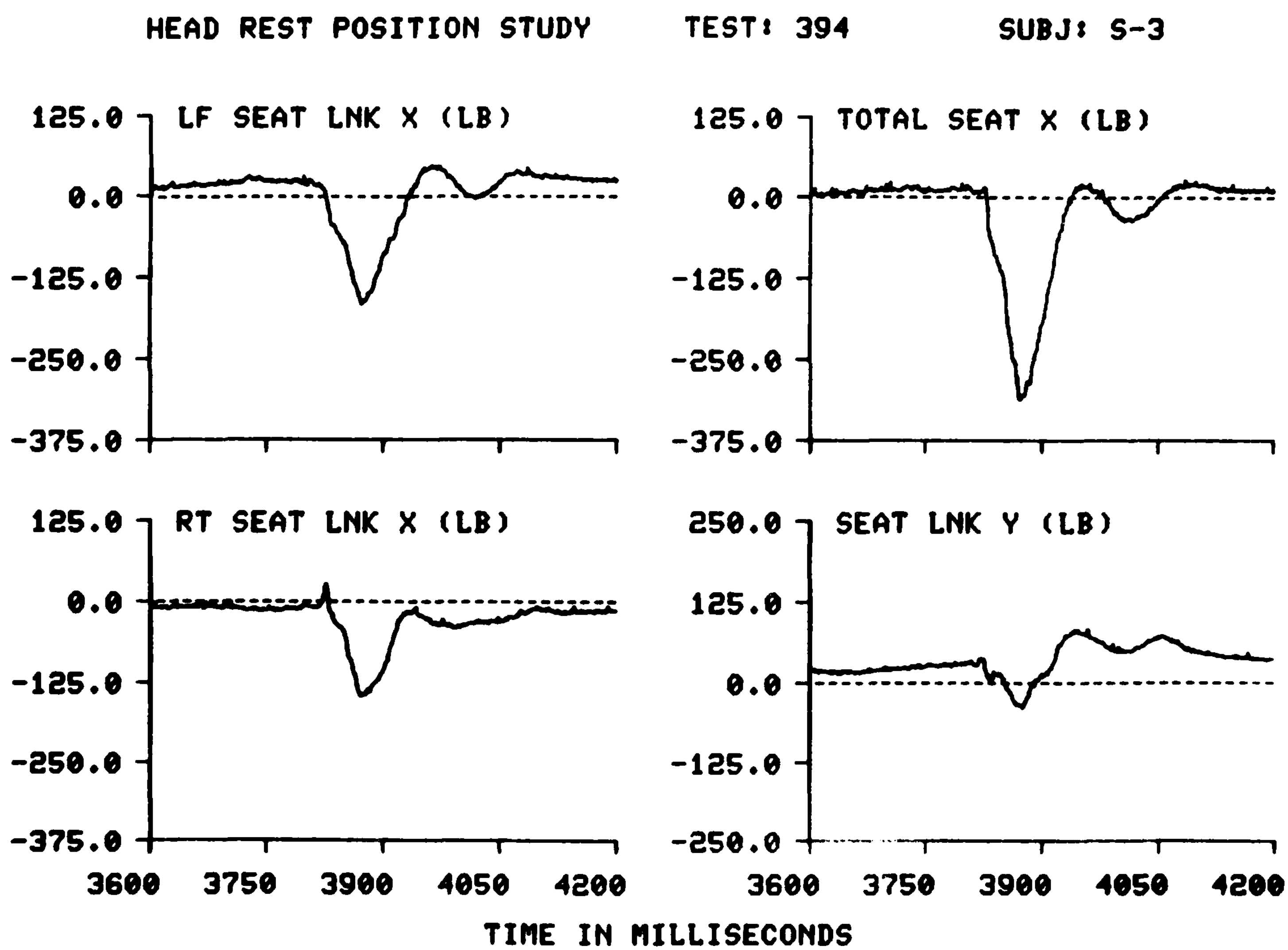
HEAD REST POSITION STUDY TEST: 394 SUBJ: S-3

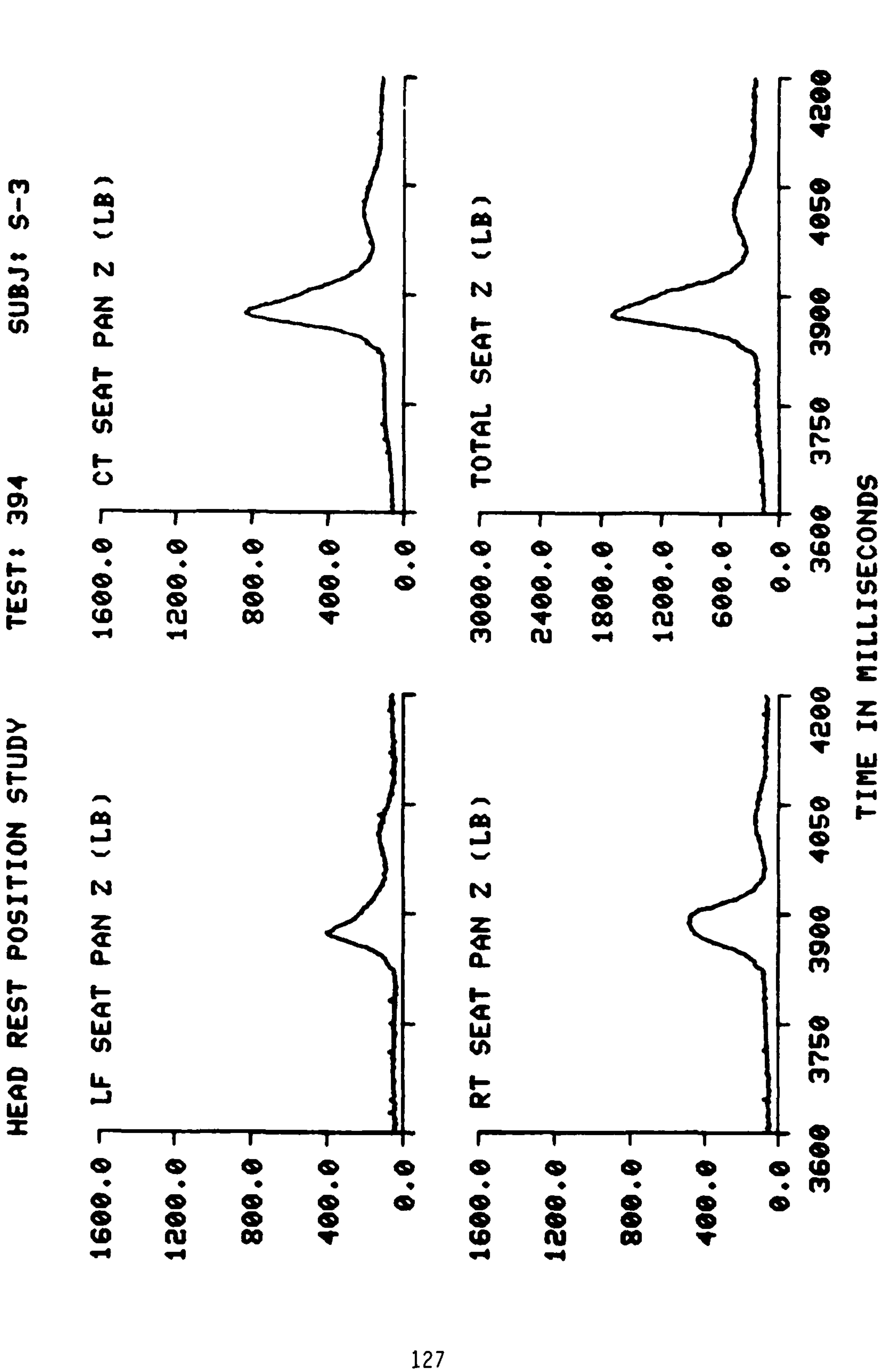


HEAD REST POSITION STUDY TEST: 394 SUBJ: [illegible]

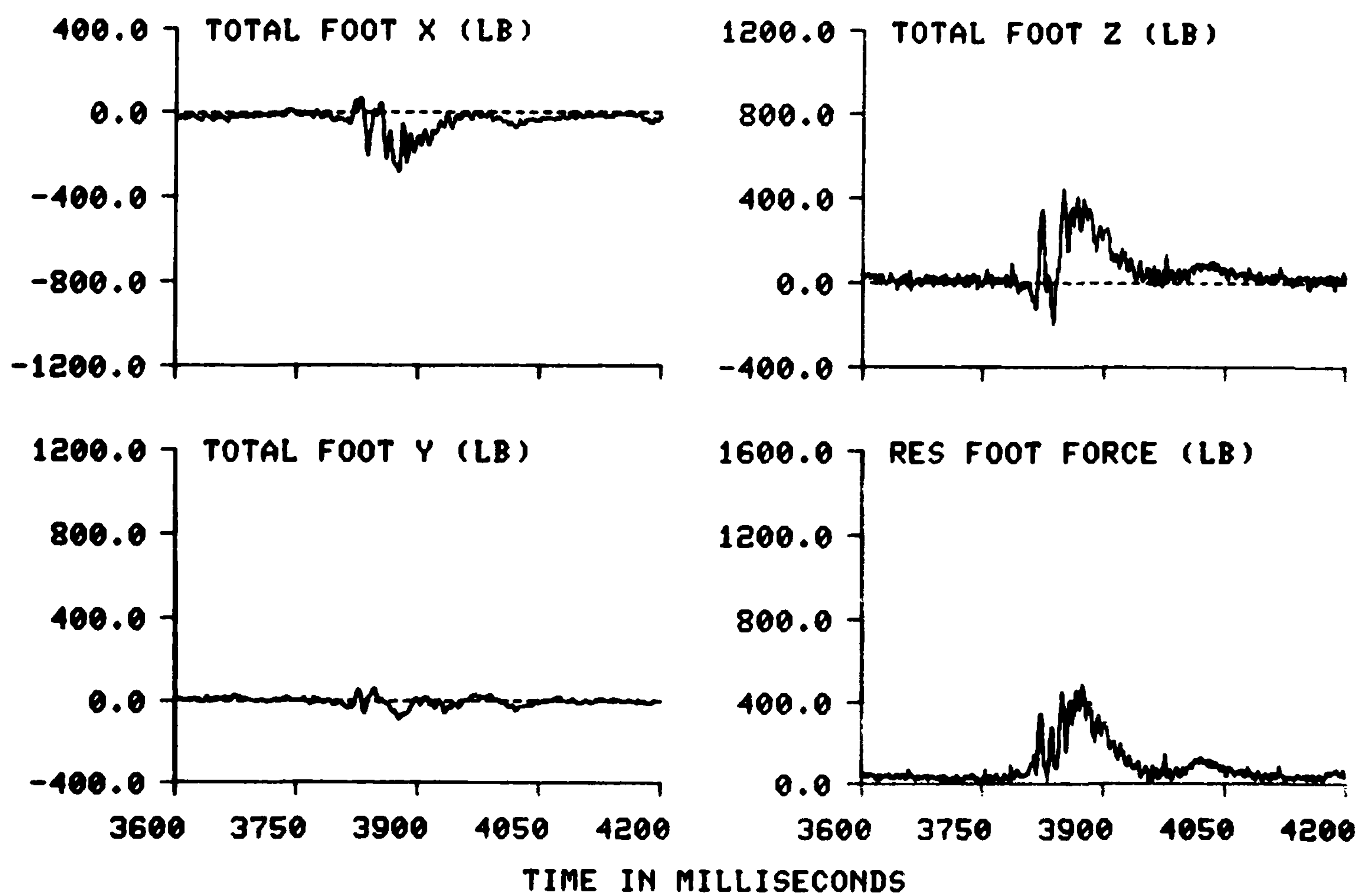



HEAD REST POS
SUBJ: S-3
LF LAP BELT
RT LAP BELT (LB)
TOTAL
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN


HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
LF SEAT LNK X (LB)
TOTAL SEAT X (LB)
RT SEAT LNK X (LB)
SEAT LNK Y (LB)
125.0
0.0
-125.0
-250.0
-375.0
250.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
LF SEAT PAN Z (LB)
CT SEAT PAN Z (LB)
RT SEAT PAN Z (LB)
TOTAL SEAT Z (LB)
1600.0
1200.0
800.0
400.0
0.0
3000.0
2400.0
1800.0
1200.0
600.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

HEAD REST POSITION STUDY TEST: 394 SUBJ: S-3



NEG SHLD HAR ANG TEST: 461 SUBJ: D-1 WT: 216.0 [illegible]

DATA ID	MAX	MIN	T1	T2	[illegible]
10V EXT PWR	10.02	9.98	[illegible]	[illegible]	[illegible]
CARRIAGE X	1.16	[illegible]	[illegible]	[illegible]	[illegible]
CARRIAGE Y	0.88	-0.4[illegible]	3876.00	[illegible]	[illegible]
CARRIAGE Z	12.44	[illegible]	[illegible]	[illegible]	[illegible]
CARRIAGE Z (SM)	10.56	-0.06	3867.00	[illegible]	
CARRIAGE VEL	-1.26	-26.22	[illegible]	[illegible]	[illegible]
SEAT X	1.28	-1.24	[illegible]	[illegible]	[illegible]
SEAT Y	0.79	-0.91	[illegible]	[illegible]	[illegible]
SEAT Z	11.62	-0.13	3873.00	[illegible]	[illegible]
SEAT Z (SM)	10.73	0.07	3874.00	[illegible]	
CHEST X	4.52	-1.89	3882.00	[illegible]	[illegible]
CHEST Y	-0.39	-2.64	3868.00	[illegible]	[illegible]
CHEST Z	14.63	-0.41	[illegible]	[illegible]	[illegible]
CHEST RES	14.95	0.73	[illegible]	[illegible]	
CHEST SI	30.77		3629.00	[illegible]	
HEAD X	2.56	-2.33	3986.00	[illegible]	[illegible]
HEAD Y	2.39	0.66	[illegible]	[illegible]	[illegible]
HEAD Z	11.85	1.30	3885.00	[illegible]	[illegible]
HEAD RES	12.15	1.41	3885.00	[illegible]	
HEAD SI	16.77		3841.00	[illegible]	
HEAD HIC	14.15		[illegible]	[illegible]	
SHD REFL LF	61.19	2.50	[illegible]	[illegible]	[illegible]
SHD REEL LF	43.47	5.32	[illegible]	[illegible]	[illegible]
LF SHOULDER	89.92	9.93	[illegible]	[illegible]	
SHD REFL RT	62.01	11.99	3957.00	[illegible]	[illegible]
SHD REEL RT	47.30	5.96	3924.00	[illegible]	[illegible]
RT SHOULDER	83.14	16.83	3931.00	[illegible]	
TOTAL SHLD REFL	122.12	16.56	3957.00	[illegible]	
TOTAL SHLD REEL	85.11	11.83	3929.00	[illegible]	
TOTAL SHOULDER	172.02	30.87	3948.00	[illegible]	
TOTAL SHD / WT	0.80	0.14	3948.00	[illegible]	
LF LAP BELT	46.50	24.06	[illegible]	[illegible]	[illegible]
RT LAP BELT	53.72	31.23	[illegible]	[illegible]	[illegible]
TOTAL LAP	97.05	56.78	[illegible]	[illegible]	
TOTAL LAP / WT	0.45	0.26	3954.	[illegible]	
CROTCH STRAP	303.89	-22.29	[illegible]	[illegible]	[illegible]
LF SEAT LNK X	44.62	-212.91	[illegible]	3881.00	18
RT SEAT LNK X	22.25	-74.90	3945.00	3881.00	19
TOTAL SEAT X	41.04	-287.82	4199.00	3881.00	
SEAT LNK Y	71.01	-65.11	[illegible]	3882.00	[illegible]
LF SEAT PAN Z	563.62	61.93	[illegible]	3655.00	[illegible]
RT SEAT PAN Z	441.35	47.98	3884.00	[illegible]	[illegible]
CT SEAT PAN Z	1194.74	[illegible]	[illegible]	[illegible]	
TOTAL SEAT Z	2194.61	[illegible]	[illegible]	[illegible]	
TOTAL SEAT Z / WT	10.16	[illegible]	[illegible]	[illegible]	
RES SEAT FORCE	2213.44	[illegible]	[illegible]	[illegible]	
RES SEAT FORCE / WT	10.25	[illegible]	[illegible]	[illegible]	
LF FOOT X	5.55	-159.9[illegible]	[illegible]	[illegible]	
RT FOOT X	16.41	-123.70	[illegible]	[illegible]	[illegible]
CT FOOT X	-34.61	-297.57	[illegible]	[illegible]	[illegible]
TOTAL FOOT X	-21.47	-580.27	3833.00	[illegible]	
LF FOOT Y	160.88	-1.59	[illegible]	[illegible]	
RT FOOT Y	29.34	-124.19	[illegible]	[illegible]	[illegible]
CT FOOT Y	-1.30	-68.05	3685.00	[illegible]	[illegible]
TOTAL FOOT Y	40.94	-63.64	3925.00	[illegible]	
LF FOOT Z	219.56	-20.43	3870.00	[illegible]	[illegible]
RT FOOT Z	264.27	24.22	3878.00	[illegible]	[illegible]
CT FOOT Z	142.31	-100.49	[illegible]	[illegible]	[illegible]
TOTAL FOOT Z	556.06	-65.92	[illegible]	[illegible]	
RES FOOT FORCE	733.02	74.99	[illegible]	[illegible]	

NEG SHLD HAR ANG TEST: 456 SUBJ: F-3 WT: 161.0 G: 10 GP: 1 CELL: 3

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.02	9.98	1491.00	118.00	48
CARRIAGE X	1.32	-1.06	3797.00	3809.00	36
CARRIAGE Y	0.80	-0.77	3789.00	3810.00	31
CARRIAGE Z	12.07	-0.23	3831.00	3751.00	1
CARRIAGE Z (SM)	10.39	-0.09	3846.00	3753.00	
CARRIAGE VEL	-0.86	-24.54	4192.00	3773.00	29
SEAT X	1.75	-1.02	3796.00	3808.00	32
SEAT Y	0.91	-1.15	3794.00	3803.00	33
SEAT Z	11.29	-0.23	3837.00	3655.00	34
SEAT Z (SM)	10.56	-0.13	3838.00	3655.00	
CHEST X	2.07	-2.67	3848.00	3891.00	5
CHEST Y	-0.46	-2.27	3833.00	3845.00	6
CHEST Z	16.11	-0.72	3861.00	3658.00	7
CHEST RES	16.19	1.30	3861.00	3654.00	
CHEST SI	28.36		3801.00	3916.00	
HEAD X	.83	-1.43	3838.00	3891.00	2
HEAD Y	2.41	-0.07	3923.00	3859.00	3
HEAD Z	11.86	-1.07	3854.00	3664.00	4
HEAD RES	11.86	1.68	3854.00	4034.00	
HEAD SI	18.92		3807.00	3914.00	
HEAD HIC	16.56		3825.00	3893.00	
SHD REFL LF	42.84	3.10	3914.00	3834.00	14
SHD REEL LF	58.63	10.49	3889.00	3844.00	16
LF SHOULDER	93.33	16.46	3890.00	3844.00	
SHD REFL RT	47.29	19.97	3929.00	3833.00	15
SHD REEL RT	52.04	8.53	3890.00	3959.00	17
RT SHOULDER	92.57	39.26	3890.00	3853.00	
TOTAL SHLD REFL	81.51	23.09	3927.00	3834.00	
TOTAL SHLD REEL	110.45	23.30	3889.00	4086.00	
TOTAL SHOULDER	185.90	57.95	3890.00	3845.00	
TOTAL SHD / WT	1.15	0.36	3890.00	3845.00	
LF LAP BELT	41.36	4.47	3924.00	3840.00	8
RT LAP BELT	52.34	7.02	3927.00	3841.00	9
TOTAL LAP	93.54	11.68	3926.00	3840.00	
TOTAL LAP / WT	0.58	0.07	3926.00	3840.00	
CROTCH STRAP	144.89	13.65	3922.00	3841.00	10
LF SEAT LNK X	41.75	-170.84	3925.00	3851.00	18
RT SEAT LNK X	34.84	-62.93	3800.00	3845.00	19
TOTAL SEAT X	47.69	-233.16	3925.00	3851.00	
SEAT LNK Y	66.81	-46.22	3901.00	3854.00	35
LF SEAT PAN Z	439.69	26.68	3854.00	3613.00	11
RT SEAT PAN Z	322.55	28.19	3853.00	3655.00	12
CT SEAT PAN Z	814.30	69.90	3855.00	3603.00	13
TOTAL SEAT Z	1572.26	134.78	3853.00	3613.00	
TOTAL SEAT Z / WT	8.77	0.84	3853.00	3613.00	
RES SEAT FORCE	1589.22	144.81	3853.00	3613.00	
RES SEAT FORCE / WT	9.87	0.90	3853.00	3613.00	
LF FOOT X	-25.79	-197.57	4159.00	3847.00	20
RT FOOT X	12.60	-70.23	3837.00	3849.00	23
CT FOOT X	-78.42	-297.66	4180.00	3847.00	26
TOTAL FOOT X	-104.14	-556.37	4158.00	3848.00	
LF FOOT Y	160.75	-6.95	3833.00	4031.00	21
RT FOOT Y	15.87	-129.67	3893.00	3850.00	24
CT FOOT Y	32.57	-77.78	3800.00	3855.00	27
TOTAL FOOT Y	61.00	-60.61	3891.00	3853.00	
LF FOOT Z	224.57	12.15	3834.00	3790.00	22
RT FOOT Z	225.60	27.47	3858.00	4178.00	25
CT FOOT Z	101.27	-121.92	3839.00	3806.00	28
TOTAL FOOT Z	485.08	-26.75	3835.00	3789.00	
RES FOOT FORCE	679.80	118.84	3851.00	4178.00	

NEG SHLD HAR ANG TEST: 467 SUBJ: F-2 WT: 158.0 G: 10 GP: 1 CELL: 3

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.02	9.98	221.00	1121.00	48
CARRIAGE X	1.68	-1.15	3878.00	3900.00	36
CARRIAGE Y	1.05	-1.07	3874.00	3870.00	31
CARRIAGE Z	12.29	-0.64	3913.00	3833.00	1
CARRIAGE Z (SM)	10.42	-0.17	3914.00	3833.00	
CARRIAGE VEL	-1.33	-26.23	4193.00	3873.00	29
SEAT X	1.67	-1.45	3907.00	3899.00	32
SEAT Y	0.91	-1.19	3884.00	3889.00	33
SEAT Z	11.51	-0.20	3919.00	3743.00	34
SEAT Z (SM)	10.42	-0.14	3920.00	3744.00	
CHEST X	3.53	-2.19	3934.00	3981.00	5
CHEST Y	-0.12	-1.98	3984.00	3929.00	6
CHEST Z	18.31	-0.26	3941.00	3742.00	7
CHEST RES	16.57	0.85	3941.00	3763.00	
CHEST SI	36.38		3881.00	4005.00	
HEAD X	2.74	-2.85	3933.00	3972.00	2
HEAD Y	2.11	0.33	4029.00	3929.00	3
HEAD Z	13.10	-2.37	3935.00	4035.00	4
HEAD RES	13.36	1.63	3935.00	4045.00	
HEAD SI	21.32		3891.00	3999.00	
HEAD HIC	17.85		3911.00	3972.00	
SHD REFL LF	22.07	1.44	3975.00	3925.00	14
SHD REEL LF	28.74	1.53	3977.00	3929.00	16
LF SHOULDER	50.46	5.13	3977.00	3926.00	
SHD REFL RT	31.81	7.46	3973.00	3918.00	15
SHD REEL RT	37.18	0.67	3971.00	3942.00	17
RT SHOULDER	68.89	11.12	3971.00	3925.00	
TOTAL SHLD REFL	53.74	10.73	3975.00	3925.00	
TOTAL SHLD REEL	62.66	3.32	3975.00	3930.00	
TOTAL SHOULDER	116.39	16.27	3975.00	3926.00	
TOTAL SHD / WT	0.74	0.10	3975.00	3926.00	
LF LAP BELT	40.95	10.50	4008.00	3947.00	8
RT LAP BELT	59.22	22.36	4014.00	3922.00	9
TOTAL LAP	99.35	33.48	4015.00	3947.00	
TOTAL LAP / WT	0.63	0.21	4015.00	3947.00	
CROTCH STRAP	120.59	-6.52	4019.00	3941.00	10
LF SEAT LNK X	3.49	-264.98	3719.00	3935.00	18
RT SEAT LNK X	-2.08	-134.89	3644.00	3935.00	19
TOTAL SEAT X	-3.27	-399.88	3602.00	3935.00	
SEAT LNK Y	48.30	-106.05	4045.00	3932.00	35
LF SEAT PAN Z	539.92	36.28	3935.00	3636.00	11
RT SEAT PAN Z	369.78	20.59	3938.00	3605.00	12
CT SEAT PAN Z	678.82	37.26	3938.00	3603.00	13
TOTAL SEAT Z	1581.65	97.39	3938.00	3605.00	
TOTAL SEAT Z / WT	10.01	0.62	3938.00	3605.00	
RES SEAT FORCE	1633.39	98.75	3938.00	3605.00	
RES SEAT FORCE / WT	10.34	0.62	3938.00	3605.00	
LF FOOT X	21.68	-67.83	3881.00	3916.00	20
RT FOOT X	30.01	-81.01	3879.00	3931.00	23
CT FOOT X	-7.96	-207.42	3881.00	3931.00	26
TOTAL FOOT X	39.33	-349.93	3881.00	3931.00	
LF FOOT Y	121.22	-8.93	3923.00	3887.00	21
RT FOOT Y	12.28	-159.90	3880.00	3914.00	24
CT FOOT Y	52.86	-22.78	3882.00	4070.00	27
TOTAL FOOT Y	81.35	-75.29	3881.00	3886.00	
LF FOOT Z	172.33	0.62	3940.00	3875.00	22
RT FOOT Z	194.06	8.51	3916.00	3970.00	25
CT FOOT Z	186.98	-91.41	3921.00	3875.00	28
TOTAL FOOT Z	532.23	-52.82	3923.00	3875.00	
RES FOOT FORCE	592.61	98.54	3924.00	4191.00	

NEG [illegible] TEST: 513 SUBJ: F-4 WT: 149.0 G: 10 GP: 2 CELL: [illegible]

[illegible]	MAX	MIN	T1	T2	CH
[illegible]	10.05	9.97	1045.00	[illegible]	[illegible]
[illegible]	1.52	1.44	[illegible]	[illegible]	[illegible]
[illegible]	0.94	-0.40	3858.00	[illegible]	[illegible]
[illegible] Z	11.87	-0.17	3904.00	[illegible]	[illegible]
[illegible]	10.89	-0.03	3904.00	[illegible]	
[illegible]	-1.06	-26.17	4153.00	[illegible]	29
[illegible]	2.07	-1.83	3910.00	[illegible]	32
[illegible]	0.82	-0.88	3884.00	[illegible]	33
[illegible]	12.78	-0.24	3913.00	3737.00	34
[illegible]	11.33	-0.14	3912.00	[illegible]	
[illegible]	3.46	-1.78	3930.00	[illegible]	5
[illegible]	-0.54	-2.37	3962.00	[illegible]	6
[illegible]	15.66	-1.02	3927.00	[illegible]	7
[illegible]	16.17	1.27	3929.00	[illegible]	
[illegible]	29.62		3865.00	[illegible]	
[illegible]	0.94	-3.65	3918.00	[illegible]	2
[illegible]	1.95	0.55	3980.00	3927.00	3
[illegible]	13.90	-1.09	3926.00	3774.00	4
[illegible]	13.92	0.72	3926.00	3860.00	
[illegible]	20.90		3873.00	4002.00	
[illegible]	16.55		3904.00	3950.00	
[illegible]	35.91	3.60	3978.00	3911.00	14
[illegible]	24.02	2.40	3955.00	3921.00	16
[illegible]	57.56	6.11	3978.00	3911.00	
[illegible]	33.50	7.13	3991.00	3916.00	15
[illegible]	25.16	6.08	3987.00	3905.00	17
[illegible]	57.61	14.74	3988.00	3905.00	
[illegible]	66.49	12.80	3991.00	3909.00	
[illegible]	43.20	9.34	3978.00	3904.00	
[illegible]	106.55	22.88	3977.00	3905.00	
[illegible] WT	0.72	0.15	3977.00	3905.00	
[illegible]	29.08	0.58	3991.00	3927.00	8
[illegible]	37.24	2.84	3984.00	3915.00	9
TOTAL LAP [illegible]	63.65	6.94	3999.00	3916.00	
[illegible] WT	0.43	0.05	3999.00	3916.00	
CROTCH STRAP	93.94	2.46	3994.00	3922.00	10
LF SEAT LNK X	32.82	-228.75	3794.00	3924.00	18
RT SEAT LNK X	26.86	-110.26	3870.00	3923.00	19
TOTAL SEAT X	34.93	-338.39	3824.00	3924.00	
SEAT [illegible]	66.48	-98.81	4006.00	3928.00	35
LF SEAT [illegible] Z	476.50	36.07	3921.00	3623.00	11
RT [illegible] Z	439.57	15.80	3918.00	3611.00	12
CT [illegible] Z	688.26	42.47	3927.00	3605.00	13
TOTAL SEAT Z	1583.82	108.26	3925.00	3608.00	
TOTAL SEAT Z [illegible] WT	10.63	0.73	3925.00	3609.00	
[illegible]	1621.16	110.57	3926.00	3606.00	
[illegible] WT	10.88	0.74	3926.00	3608.00	
[illegible]	-2.50	-123.65	4009.00	3920.00	20
[illegible]	51.97	-40.55	3913.00	3919.00	23
[illegible]	-15.94	-173.36	3869.00	3921.00	26
[illegible]	-12.54	-333.12	3868.00	3920.00	
[illegible]	128.92	-2.10	3909.00	3991.00	21
[illegible]	21.33	-79.83	3960.00	3908.00	24
[illegible]	0.61	-78.60	4003.00	3909.00	27
[illegible]	56.83	-48.50	3888.00	3917.00	
[illegible]	186.03	-14.82	3908.00	3877.00	22
[illegible]	190.51	11.68	3913.00	4009.00	25
[illegible]	199.16	-112.52	3914.00	3880.00	28
[illegible]	490.55	57.24	3914.00	3878.00	
[illegible]	506.[illegible]	50.03	3910.00	4009.00	

NEG SHLD HAR ANG TEST: 463 SUBJ: G-3 WT: 161.0 G: 10 GP: 1 CELL: 3

DATA ID	MAX	MIN	T1	T2	[illegible]
10V EXT PWR	10.02	9.98	542.00	[illegible]	[illegible]
CARRIAGE X	1.59	-1.30	3913.00	[illegible]	[illegible]
CARRIAGE Y	1.10	-0.64	3913.00	[illegible]	
CARRIAGE Z	12.81	-0.14	3907.00	[illegible]	
CARRIAGE Z (SM)	10.68	-0.06	3907.00	[illegible]	
CARRIAGE VE	-1.21	-26.20	4191.00	[illegible]	
SEAT X	1.16	-1.49	3901.00	[illegible]	[illegible]
SEAT Y	1.65	-2.03	3872.00	3878.00	[illegible]
SEAT Z	11.62	-0.18	3913.00	3755.00	34
SEAT Z (SM)	10.66	-0.08	3914.00	3734.00	
CHEST X	4.20	-1.96	3927.00	3972.00	5
CHEST Y	-0.22	-2.29	3995.00	3939.00	6
CHEST Z	21.87	-0.95	3940.00	3730.00	7
CHEST RES	22.06	1.04	3940.00	3682.00	
CHEST SI	42.59		3873.00	3987.00	
HEAD X	2.26	-4.57	3924.00	3977.00	2
HEAD Y	2.95	1.00	4023.00	3956.00	3
HEAD Z	11.80	-1.63	3923.00	3741.00	4
HEAD RES	12.17	1.99	3924.00	4081.00	
HEAD SI	16.57		3885.00	3999.00	
HEAD HIC	13.16		3899.00	3984.00	
SHD REEL LF	38.39	6.83	3955.00	3920.00	14
SHD REEL LF	67.92	4.43	3958.00	4050.00	16
LF SHOULDER	105.38	15.56	3957.00	4053.00	
SHD REEL RT	32.85	11.07	3968.00	3908.00	15
SHD REEL RT	52.75	1.24	3966.00	4057.00	17
RT SHOULDER	85.15	15.13	3966.00	4059.00	
TOTAL SHD REEL	68.61	20.20	3962.00	[illegible]	
TOTAL SHD REEL	115.75	6.04	3964.00	[illegible]	
TOTAL SHOULDER	184.29	31.43	3963.00	[illegible]	
TOTAL SHOULDER / WT	1.14	0.20	3963.00	4053.00	
LF LAP BELT	58.99	21.42	3996.00	3933.00	8
RT LAP BELT	81.78	23.35	4007.00	[illegible]	9
TOTAL LAP	120.59	45.24	4007.00	[illegible]	
TOTAL LAP / WT	0.75	0.28	4007.00	3916.00	
CROTCH STRAP	46.17	-25.71	4013.00	3922.00	10
LF SEAT LNK X	19.93	-170.19	4131.00	3928.00	18
RT SEAT LNK X	23.33	-92.88	3663.00	3921.00	19
TOTAL SEAT X	24.89	-263.07	3601.00	3928.00	
SEAT LNK Y	39.16	-73.87	3997.00	3927.00	35
LF SEAT PAN Z	594.75	57.77	3930.00	3600.00	11
RT SEAT PAN Z	566.16	41.44	3931.00	3634.00	12
CT SEAT PAN Z	620.19	52.26	3930.00	3610.00	13
TOTAL SEAT Z	1778.35	156.37	3930.00	3602.00	
TOTAL SEAT Z / WT	11.05	0.97	3930.00	3602.00	
RES SEAT FORCE	1797.70	158.42	3930.00	3602.00	
RES SEAT FORCE / WT	11.17	0.98	3930.00	3602.00	
LF FOOT X	25.26	-89.56	3874.00	3934.00	20
RT FOOT X	36.18	-48.41	3913.00	3934.00	23
CT FOOT X	44.70	-169.96	3875.00	3935.00	26
TOTAL FOOT X	99.92	-305.25	3874.00	3934.00	
LF FOOT Y	108.38	-6.04	3909.00	3856.00	21
RT FOOT Y	27.71	-95.65	3893.00	3917.00	24
CT FOOT Y	9.81	-56.94	4015.00	3926.00	27
TOTAL FOOT Y	71.25	-73.03	3894.00	3926.00	
LF FOOT Z	165.08	-57.42	3933.00	3867.00	22
RT FOOT Z	159.81	-17.34	3934.00	4008.00	25
CT FOOT Z	150.11	-80.52	3929.00	3864.00	28
TOTAL FOOT Z	372.91	-120.99	3928.00	3865.00	
RES FOOT FORCE	471.78	12.24	3934.00	3985.00	

NEG SHLD HAR ANG   TEST: 465   SUBJ: G-2   WT: 118.0   G: 10   GP: 1   CELL: 5

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.02	9.98	73.00	312.00	48
CARRIAGE X	1.08	-1.16	3851.00	3897.00	36
CARRIAGE Y	0.87	-0.59	3843.00	3866.00	31
CARRIAGE Z	12.51	-0.20	3883.00	3655.00	1
CARRIAGE Z (SM)	10.48	-0.08	3883.00	3656.00	
CARRIAGE VEL	-1.18	-26.17	4167.00	3807.00	23
SEAT X	1.40	-1.35	3849.00	3895.00	32
SEAT Y	0.38	-0.89	3885.00	3855.00	33
SEAT Z	11.94	-0.23	3889.00	3694.00	34
SEAT Z (SM)	10.63	-0.15	3890.00	3692.00	
CHEST X	3.33	-2.07	3901.00	3960.00	5
CHEST Y	0.03	-1.61	3962.00	3945.00	6
CHEST Z	14.91	-1.09	3920.00	3813.00	7
CHEST RES	14.94	0.75	3920.00	3844.00	
CHEST SI	28.03		3849.00	3979.00	
HEAD X	0.48	-3.35	3842.00	3945.00	2
HEAD Y	1.86	0.81	3966.00	3910.00	3
HEAD Z	12.40	-1.38	3906.00	3710.00	4
HEAD RES	12.43	1.34	3907.00	4173.00	
HEAD SI	17.74		3857.00	3974.00	
HEAD HIC	14.66		3884.00	3947.00	
SHD REFL LF	16.08	4.23	3933.00	3901.00	14
SHD REEL LF	21.90	4.31	3967.00	3922.00	16
LF SHOULDER	32.41	8.81	3965.00	3901.00	
SHD REFL RT	26.65	11.31	3967.00	4029.00	15
SHD REEL RT	23.37	1.20	3950.00	3908.00	17
RT SHOULDER	46.96	15.19	3951.00	4043.00	
TOTAL SHLD REFL	37.22	15.88	3965.00	4027.00	
TOTAL SHLD REEL	39.83	6.11	3955.00	3901.00	
TOTAL SHOULDER	75.90	25.36	3956.00	4047.00	
TOTAL SHD / WT	0.64	0.21	3956.00	4047.00	
LF LAP BELT	26.22	3.58	3972.00	3891.00	8
RT LAP BELT	25.08	3.07	3972.00	3890.00	9
TOTAL LAP	51.31	6.77	3972.00	3891.00	
TOTAL LAP / WT	0.43	0.06	3972.00	3891.00	
CROTCH STRAP	73.26	5.89	3973.00	3910.00	10
LF SEAT LNK X	42.21	-120.84	3820.00	3903.00	18
RT SEAT LNK X	44.32	-15.32	3848.00	3913.00	19
TOTAL SEAT X	64.47	-134.93	3824.00	3908.00	
SEAT LNK Y	38.05	-26.97	3958.00	3895.00	35
LF SEAT PAN Z	338.78	37.74	3898.00	4156.00	11
RT SEAT PAN Z	338.05	26.92	3903.00	3742.00	12
CT SEAT PAN Z	528.51	29.22	3906.00	3615.00	13
TOTAL SEAT Z	1192.31	101.99	3903.00	3608.00	
TOTAL SEAT Z / WT	10.10	0.86	3903.00	3608.00	
RES SEAT FORCE	1200.05	113.37	3903.00	3608.00	
RES SEAT FORCE / WT	10.17	0.96	3903.00	3608.00	
LF FOOT X	6.22	-72.44	3950.00	3897.00	20
RT FOOT X	11.45	-77.54	3849.00	3900.00	23
CT FOOT X	-40.71	-207.08	3852.00	3900.00	26
TOTAL FOOT X	-35.40	-355.25	3852.00	3900.00	
LF FOOT Y	123.05	-9.71	3885.00	3951.00	21
RT FOOT Y	14.98	-139.43	3851.00	3885.00	24
CT FOOT Y	21.27	-24.12	3866.00	4037.00	27
TOTAL FOOT Y	47.19	-66.83	3851.00	3857.00	
LF FOOT Z	165.88	1.99	3886.00	4030.00	22
RT FOOT Z	184.84	8.19	3886.00	4004.00	25
CT FOOT Z	108.11	-90.36	3891.00	3859.00	28
TOTAL FOOT Z	395.33	-16.06	3886.00	3843.00	
RES FOOT FORCE	493.33	49.13	3886.00	4182.00	

NEG SHLD HAR ANG TEST: 524 SUBJ: H-3 WT: 186.0 G: 10 GP: 2 CELL: G

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	545.00	1422.00	48
CARRIAGE X	0.83	-1.12	3869.00	3852.00	35
CARRIAGE Y	0.79	-0.85	3992.00	3997.00	31
CARRIAGE Z	11.31	-0.22	3865.00	3775.00	1
CARRIAGE Z (SM)	10.64	-0.07	3864.00	3775.00	
CARRIAGE VEL	-1.22	-25.87	4159.00	3807.00	29
SEAT X	1.08	-1.03	3822.00	3862.00	32
SEAT Y	0.99	-0.86	3997.00	4021.00	33
SEAT Z	11.68	-0.17	3870.00	3674.00	34
SEAT Z (SM)	11.04	-0.12	3871.00	3675.00	
CHEST X	4.28	-3.31	3883.00	3940.00	5
CHEST Y	0.22	-1.92	3956.00	3913.00	6
CHEST Z	17.56	-1.25	3887.00	3933.00	7
CHEST RES	17.98	0.54	3887.00	3669.00	
CHEST SI	36.85		3823.00	3950.00	
HEAD X	3.05	-2.92	3880.00	3940.00	2
HEAD Y	2.02	-0.11	4132.00	3880.00	3
HEAD Z	11.37	-1.28	3883.00	3662.00	4
HEAD RES	11.76	1.17	3883.00	3963.00	
HEAD SI	19.03		3835.00	3953.00	
HEAD HIC	16.56		3858.00	3924.00	
SHD REFL LF	44.39	0.31	3953.00	3871.00	14
SHD REEL LF	52.59	-2.50	3934.00	4025.00	16
LF SHOULDER	81.87	3.96	3936.00	3872.00	
SHD REFL RT	45.64	4.90	3940.00	4017.00	15
SHD REEL RT	66.58	-3.68	3930.00	3872.00	17
RT SHOULDER	103.83	3.88	3931.00	3872.00	
TOTAL SHLD REFL	87.34	7.79	3953.00	3873.00	
TOTAL SHLD REEL	113.38	-1.32	3931.00	4013.00	
TOTAL SHOULDER	178.60	7.84	3935.00	3872.00	
TOTAL SHD / WT	0.96	0.04	3935.00	3872.00	
LF LAP BELT	37.98	16.39	3955.00	3904.00	8
RT LAP BELT	54.81	21.34	3950.00	3869.00	9
TOTAL LAP	89.02	38.78	3954.00	3869.00	
TOTAL LAP / WT	0.48	0.21	3954.00	3869.00	
CROTCH STRAP	136.90	-26.75	3949.00	3878.00	10
LF SEAT LNK X	38.92	-182.89	3814.00	3879.00	18
RT SEAT LNK X	67.78	-87.78	3934.00	3888.00	19
TOTAL SEAT X	74.06	-267.21	3950.00	3888.00	
SEAT LNK Y	77.55	-18.46	3952.00	3877.00	35
LF SEAT PAN Z	363.11	19.48	3879.00	3604.00	11
RT SEAT PAN Z	557.62	28.97	3888.00	3643.00	12
CT SEAT PAN Z	899.85	56.58	3884.00	3626.00	13
TOTAL SEAT Z	1808.15	121.36	3887.00	3642.00	
TOTAL SEAT Z / WT	9.72	0.65	3887.00	3642.00	
RES SEAT FORCE	1827.47	123.54	3887.00	3642.00	
RES SEAT FORCE / WT	9.83	0.66	3887.00	3642.00	
LF FOOT X	0.13	-138.20	3826.00	3885.00	20
RT FOOT X	14.96	-77.56	3826.00	3902.00	23
CT FOOT X	-0.75	-230.62	3827.00	3886.00	26
TOTAL FOOT X	12.53	-434.90	3827.00	3885.00	
LF FOOT Y	123.44	-5.83	3894.00	3958.00	21
RT FOOT Y	33.76	-109.79	3920.00	3869.00	24
CT FOOT Y	22.77	-57.33	3997.00	3882.00	27
TOTAL FOOT Y	49.85	-52.34	3920.00	3871.00	
LF FOOT Z	180.82	8.58	3868.00	4018.00	22
RT FOOT Z	206.45	-4.42	3894.00	3991.00	25
CT FOOT Z	207.67	-65.53	3872.00	3818.00	28
TOTAL FOOT Z	539.15	-42.52	3894.00	3817.00	
RES FOOT FORCE	672.39	69.12	3894.00	3677.00	

NEG SHLD HRP RNG TEST: 520 SUBJ: H-5 WT: 136.0 G: 10 GP: 2 CELL: 5

DATA ID	MAX	MIN	T1	T2	[illegible]
10V EXT PWR	10.05	9.96	1509.00	[illegible]	[illegible]
CARRIAGE X	1.39	-1.63	[illegible]	[illegible]	[illegible]
CARRIAGE Y	0.76	-0.75	3941.00	[illegible]	[illegible]
CARRIAGE Z	11.14	-0.29	3908.00	[illegible]	[illegible]
CARRIAGE Z (SM)	10.70	-0.15	3909.00	[illegible]	
CARRIAGE VEL	-1.34	-25.99	[illegible]	[illegible]	[illegible]
SEAT X	2.17	-1.75	3868.00	[illegible]	32
SEAT Y	0.54	-1.14	3807.00	[illegible]	33
SEAT Z	12.18	-0.18	3915.00	[illegible]	34
SEAT Z (SM)	11.22	-0.14	3915.00	[illegible]	
CHEST X	1.35	-3.19	3998.00	3957.00	5
CHEST Y	-0.18	-2.43	3982.00	3939.00	6
CHEST Z	15.73	-0.65	3921.00	3857.00	7
CHEST RES	15.78	0.68	3921.00	3737.00	
CHEST SI	29.33		3869.00	4137.00	
HEAD X	2.53	-2.32	3920.00	3953.00	2
HEAD Y	3.30	1.29	3990.00	3881.00	3
HEAD Z	13.12	-1.36	3932.00	3639.00	4
HEAD RES	13.48	1.56	3932.00	4171.00	
HEAD SI	21.82		3879.00	4010.00	
HEAD HIC	17.86		3900.00	3962.00	
SHD REEL LF	41.75	10.89	3980.00	3909.00	14
SHD REEL LF	59.97	13.61	3950.00	3910.00	15
LF SHOULDER	88.97	24.78	3952.00	3910.00	
SHD REEL RT	38.32	14.77	3939.00	3909.00	16
SHD REEL RT	56.03	13.92	3945.00	4043.00	17
RT SHOULDER	93.94	35.95	3945.00	3908.00	
TOTAL SHLD REEL	69.00	25.66	3981.00	3908.00	
TOTAL SHLD REEL	114.10	34.62	3951.00	3911.00	
TOTAL SHOULDER	181.18	50.90	3946.00	3909.00	
TOTAL SHD / WT	1.33	0.45	3946.00	3909.00	
LF LAP BELT	39.72	3.09	4010.00	3921.00	8
RT LAP BELT	47.45	3.38	4011.00	3914.00	9
TOTAL LAP	87.04	8.63	4011.00	3920.00	
TOTAL LAP / WT	0.64	0.06	4011.00	3920.00	
CROTCH STRAP	74.30	8.10	4013.00	3923.00	10
LF SEAT LNK X	40.36	-160.71	4164.00	3922.00	18
RT SEAT LNK X	43.71	-48.53	3965.00	3922.00	19
TOTAL SEAT X	47.30	-209.23	3868.00	3922.00	
SEAT LNK Y	56.93	-28.75	3983.00	3915.00	35
LF SEAT PAN Z	314.34	19.94	3926.00	3615.00	11
RT SEAT PAN Z	348.76	17.32	3924.00	3746.00	12
CT SEAT PAN Z	777.13	59.37	3927.00	3696.00	13
TOTAL SEAT Z	1434.31	117.62	3926.00	3615.00	
TOTAL SEAT Z / WT	10.55	0.86	3926.00	3615.00	
RES SEAT FORCE	1447.76	121.63	3926.00	3615.00	
RES SEAT FORCE / WT	10.65	0.89	3926.00	3615.00	
LF FOOT X	-12.26	-145.17	3687.00	3930.00	20
RT FOOT X	21.71	-61.12	3894.00	3929.00	23
CT FOOT X	-46.60	-212.07	3868.00	3930.00	26
TOTAL FOOT X	-66.52	-414.75	3868.00	3929.00	
LF FOOT Y	124.49	-3.91	3921.00	4084.00	21
RT FOOT Y	23.45	-109.67	3959.00	3913.00	24
CT FOOT Y	7.21	-54.20	3875.00	3979.00	27
TOTAL FOOT Y	42.14	-40.09	3876.00	3993.00	
LF FOOT Z	200.44	0.30	3919.00	3883.00	22
RT FOOT Z	189.48	-5.66	3915.00	3865.00	25
CT FOOT Z	121.17	-154.99	3895.00	3887.00	28
TOTAL FOOT Z	474.70	-91.27	3918.00	3864.00	
RES FOOT FORCE	595.09	108.26	3921.00	3860.00	

NEG SHLD [illegible] TEST: 525 SUBJ: H-4 WT: 190.0 G: 10 GP: 2 [illegible]

[illegible]	MAX	MIN	[illegible]	[illegible]	
IOV EXT [illegible]	10.05	9.96	1696.00	[illegible]	
CARRIAGE X	1.59	[illegible]	[illegible]	[illegible]	
CARRIAGE Y	0.82	-0.34	3926.00	[illegible]	
CARRIAGE Z	11.36	-0.22	3905.00	[illegible]	
CARRIAGE Z (SM)	10.67	-0.09	3904.00	[illegible]	
CARRIAGE VEL	-0.92	-26.13	4133.00	[illegible]	[illegible]
SEAT X	1.89	-1.62	3867.00	[illegible]	[illegible]
SEAT Y	0.60	-0.91	3936.00	[illegible]	
SEAT Z	11.66	-0.18	3913.00	[illegible]	[illegible]
SEAT Z (SM)	11.02	-0.11	3912.00	[illegible]	
CHEST X	2.42	-2.33	3921.00	[illegible]	[illegible]
CHEST Y	0.21	-2.80	3985.00	[illegible]	[illegible]
CHEST Z	16.35	-1.09	3934.00	3730.00	
CHEST RES	16.55	1.10	3934.00	[illegible]	
CHEST SI	28.27		3867.00	[illegible]	
HEAD X	3.96	-1.55	3926.00	[illegible]	2
HEAD Y	2.40	-0.12	3978.00	[illegible]	3
HEAD Z	13.43	-1.18	3928.00	[illegible]	4
HEAD RES	14.01	0.75	3928.00	[illegible]	
HEAD SI	22.65		3873.00	4000.00	
HEAD HIC	18.27		3898.00	[illegible]	
SHD REFL LF	33.96	3.49	3968.00	4033.00	14
SHD REEL LF	51.62	4.23	3959.00	4029.00	[illegible]
LF SHOULDER	79.30	14.30	3959.00	3907.00	
SHD REFL RT	27.71	8.86	3998.00	3918.00	15
SHD REEL RT	33.95	6.12	3978.00	[illegible]	[illegible]
RT SHOULDER	53.39	18.31	3983.00	3912.00	
TOTAL SHLD REFL	58.54	14.74	3991.00	4063.00	
TOTAL SHLD REEL	72.39	11.73	3961.00	4027.00	
TOTAL SHOULDER	121.80	34.24	3966.00	3909.00	
TOTAL SHD / WT	0.64	0.18	3966.00	3909.00	
LF LAP BELT	48.69	33.83	4011.00	4090.00	8
RT LAP BELT	65.03	32.50	3991.00	3903.00	9
TOTAL LAP	112.21	68.69	3991.00	3903.00	
TOTAL LAP / WT	0.59	0.36	3991.00	3903.00	
CROTCH STRAP	113.95	-41.60	4015.00	3923.00	10
LF SEAT LNK X	18.45	-182.62	3628.00	3924.00	18
RT SEAT LNK X	38.58	-104.07	3973.00	3918.00	19
TOTAL SEAT X	13.26	-281.51	3699.00	3916.00	
SEAT LNK Y	28.32	-71.34	3846.00	3959.00	35
LF SEAT PAN Z	419.17	37.90	3929.00	3609.00	11
RT SEAT PAN Z	758.93	75.37	3927.00	3600.00	12
CT SEAT PAN Z	728.07	75.07	3925.00	3621.00	13
TOTAL SEAT Z	1875.79	196.45	3925.00	3603.00	
TOTAL SEAT Z / WT	9.87	1.03	3925.00	3603.00	
RES SEAT FORCE	1896.95	196.97	3925.00	3603.00	
RES SEAT FORCE / WT	9.98	1.04	3925.00	3603.00	
LF FOOT X	-33.07	-211.19	4196.00	3919.00	20
RT FOOT X	19.86	-122.89	3897.00	3920.00	23
CT FOOT X	-54.60	-272.83	4198.00	3923.00	26
TOTAL FOOT X	-90.14	-590.72	4163.00	3920.00	
LF FOOT Y	161.80	-3.28	3909.00	4144.00	21
RT FOOT Y	27.76	-117.78	4039.00	3917.00	24
CT FOOT Y	10.07	-69.13	3671.00	3920.00	27
TOTAL FOOT Y	44.27	-39.33	3941.00	3987.00	
LF FOOT Z	267.96	36.30	3918.00	4185.00	22
RT FOOT Z	235.80	16.60	3909.00	3871.00	25
CT FOOT Z	114.62	-106.44	3915.00	3881.00	28
TOTAL FOOT Z	596.79	33.40	3909.00	3852.00	
RES FOOT FORCE	753.35	114.22	3931.00	4163.00	

NEG SHLD HAR ANG   TEST: 458   SUBJ: K-1   WT: 183.0   G: 10   GP: 1   CELL: 3

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.02	9.98	103.00	11.00	48
CARRIAGE X	1.36	-0.89	3797.00	3810.00	36
CARRIAGE Y	0.89	-0.63	3877.00	3811.00	31
CARRIAGE Z	12.22	-0.20	3829.00	3677.00	1
CARRIAGE Z (SM)	10.30	-0.08	3829.00	3677.00	
CARRIAGE VEL	-0.84	-24.33	4073.00	3802.00	29
SEAT X	1.63	-1.16	3798.00	3803.00	32
SEAT Y	1.02	-1.21	3794.00	3795.00	33
SEAT Z	11.05	-0.12	3834.00	3642.00	34
SEAT Z (SM)	10.42	-0.07	3936.00	3671.00	
CHEST X	4.58	-1.12	3849.00	3896.00	5
CHEST Y	-0.13	-2.26	3820.00	3863.00	6
CHEST Z	15.98	-0.16	3863.00	3643.00	7
CHEST RES	16.43	0.66	3863.00	3659.00	
CHEST SI	35.31		3793.00	4073.00	
HEAD X	1.43	-4.46	3837.00	3884.00	2
HEAD Y	2.87	1.56	3912.00	3849.00	3
HEAD Z	11.22	-1.89	3852.00	3670.00	4
HEAD RES	11.41	2.29	3852.00	3935.00	
HEAD SI	16.66		3817.00	3918.00	
HEAD HIC	14.06		3824.00	3894.00	
SHD REFL LF	20.49	0.94	3927.00	3841.00	14
SHD REEL LF	21.49	4.20	3913.00	3967.00	16
LF SHOULDER	41.34	6.14	3922.00	3841.00	
SHD REFL RT	41.20	12.46	3919.00	3984.00	15
SHD REEL RT	45.92	0.89	3884.00	3845.00	17
RT SHOULDER	80.99	14.08	3884.00	3842.00	
TOTAL SHLD REFL	81.26	13.83	3926.00	3841.00	
TOTAL SHLD REEL	57.45	5.22	3884.00	3849.00	
TOTAL SHOULDER	109.17	20.23	3884.00	3841.00	
TOTAL SHD / WT	0.60	0.11	3884.00	3841.00	
LF LAP BELT	37.80	14.33	3915.00	3998.00	8
RT LAP BELT	35.90	17.69	3916.00	3971.00	9
TOTAL LAP	73.62	33.20	3915.00	3998.00	
TOTAL LAP / WT	0.40	0.18	3915.00	3998.00	
CROTCH STRAP	144.67	-47.38	3925.00	3851.00	10
LF SEAT LNK X	16.60	-163.15	4088.00	3848.00	18
RT SEAT LNK X	10.91	-155.72	3787.00	3854.00	19
TOTAL SEAT X	17.14	-316.57	4082.00	3854.00	
SEAT LNK Y	20.82	-70.94	3913.00	3848.00	35
LF SEAT PAN Z	707.63	69.60	3852.00	4082.00	11
RT SEAT PAN Z	767.15	55.43	3854.00	3609.00	12
CT SEAT PAN Z	687.74	38.54	3856.00	3604.00	13
TOTAL SEAT Z	2158.72	183.21	3854.00	3603.00	
TOTAL SEAT Z / WT	11.80	1.00	3854.00	3603.00	
RES SEAT FORCE	2182.88	183.44	3854.00	3603.00	
RES SEAT FORCE / WT	11.93	1.00	3854.00	3603.00	
LF FOOT X	14.29	-80.70	3796.00	3847.00	20
RT FOOT X	28.36	-22.75	3799.00	3846.00	23
CT FOOT X	9.19	-148.22	3795.00	3847.00	26
TOTAL FOOT X	47.38	-249.91	3796.00	3847.00	
LF FOOT Y	100.99	-3.83	3831.00	3926.00	21
RT FOOT Y	24.44	-77.61	3816.00	3831.00	24
CT FOOT Y	13.78	-51.19	3881.00	3858.00	27
TOTAL FOOT Y	68.06	-60.42	3818.00	3859.00	
LF FOOT Z	134.32	-33.15	3856.00	3786.00	22
RT FOOT Z	141.94	-33.89	3831.00	3885.00	25
CT FOOT Z	168.24	-35.46	3861.00	3808.00	28
TOTAL FOOT Z	362.56	-49.25	3831.00	3788.00	
RES FOOT FORCE	398.06	20.06	3855.00	3643.00	

NEG SHLD HAR ANG TEST: 469 SUBJ: M-[illegible] WT: 175.0 G: [illegible] GP: [illegible]

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.02	9.98	872.00	627.00	45
CARRIAGE X	1.64	-1.22	3819.00	38[illegible].00	[illegible]
CARRIAGE Y	0.73	-0.84	3826.00	38[illegible].00	31
CARRIAGE Z	11.87	-0.39	3854.00	38[illegible].00	1
CARRIAGE Z (SM)	10.19	-0.10	3855.00	3753.00	
CARRIAGE VEL	-1.24	-26.20	4161.00	3822.00	23
SEAT X	1.99	-1.29	3825.00	38[illegible]7.00	32
SEAT Y	1.34	-2.03	3822.00	3827.00	33
SEAT Z	11.44	-0.22	3860.00	365[illegible].00	34
SEAT Z (SM)	10.33	-0.12	3861.00	36[illegible]	
CHEST X	1.83	-2.51	3861.00	3914.00	5
CHEST Y	0.10	-1.38	3867.00	386[illegible].00	6
CHEST Z	18.66	-0.35	3891.00	379[illegible].00	7
CHEST RES	18.75	0.65	3891.00	3775.00	
CHEST SI	32.05		3821.00	3961.00	
HEAD X	1.12	-5.15	3862.00	3907.00	2
HEAD Y	1.49	-0.14	3950.00	388[illegible].00	3
HEAD Z	11.46	-0.56	3875.00	3622.00	4
HEAD RES	11.47	0.83	3875.00	4200.00	
HEAD SI	18.64		3827.00	4086.00	
HEAD HIC	14.06		3843.00	3931.00	
SHD REFL LF	33.04	6.38	3945.00	3858.00	14
SHD REEL LF	35.97	4.30	3922.00	3865.00	16
LF SHOULDER	64.49	11.60	3922.00	3857.00	
SHD REFL RT	29.71	12.23	3905.00	3855.00	15
SHD REEL RT	41.26	4.55	3907.00	3869.00	17
RT SHOULDER	70.63	17.74	3907.00	3857.00	
TOTAL SHLD REFL	57.48	18.94	3944.00	3858.00	
TOTAL SHLD REEL	69.27	9.34	3910.00	3867.00	
TOTAL SHOULDER	121.85	29.34	3910.00	3857.00	
TOTAL SHD / WT	0.70	0.17	3910.00	3857.00	
LF LAP BELT	28.71	4.13	4097.00	3893.00	8
RT LAP BELT	43.25	14.02	3964.00	3864.00	9
TOTAL LAP	69.81	19.63	3966.00	3893.00	
TOTAL LAP / WT	0.40	0.11	3966.00	3893.00	
CROTCH STRAP	105.62	-0.78	3952.00	3860.00	10
LF SEAT LNK X	24.58	-176.49	4171.00	3877.00	18
RT SEAT LNK X	1.54	-133.74	3826.00	3876.00	19
TOTAL SEAT X	11.05	-308.50	3945.00	3875.00	
SEAT LNK Y	67.16	-54.37	3949.00	3868.00	35
LF SEAT PAN Z	408.63	53.89	3876.00	3622.00	11
RT SEAT PAN Z	428.79	44.80	3878.00	3604.00	12
CT SEAT PAN Z	921.87	71.32	3879.00	3668.00	13
TOTAL SEAT Z	1749.54	175.25	3878.00	3604.00	
TOTAL SEAT Z / WT	10.00	1.00	3878.00	3604.00	
RES SEAT FORCE	1776.34	175.39	3878.00	3604.00	
RES SEAT FORCE / WT	10.15	1.00	3878.00	3604.00	
LF FOOT X	24.97	-79.91	3822.00	3867.00	20
RT FOOT X	21.54	-83.32	3850.00	3882.00	23
CT FOOT X	0.43	-228.54	3823.00	3868.00	26
TOTAL FOOT X	41.61	-375.88	3822.00	3867.00	
LF FOOT Y	116.97	-8.80	3856.00	3801.00	21
RT FOOT Y	14.84	-136.03	3914.00	3874.00	24
CT FOOT Y	43.48	-46.40	3822.00	3867.00	27
TOTAL FOOT Y	60.70	-82.20	3822.00	3871.00	
LF FOOT Z	195.07	-31.81	3846.00	3815.00	22
RT FOOT Z	204.07	-16.40	3873.00	3835.00	25
CT FOOT Z	200.11	-97.84	3877.00	3816.00	28
TOTAL FOOT Z	484.36	-108.52	3877.00	3815.00	
RES FOOT FORCE	574.03	74.79	3875.00	4084.00	

[illegible] TEST: 466 SUBJ: M10 WT: 148.0 G: 10 GP: 1 CELL: 3

[illegible]	MAX	MIN	T1	T2	CH
[illegible] PKR	10.02	9.98	149.00	955.00	48
[illegible] X	1.49	-0.99	3844.00	38[illegible].00	[illegible]
[illegible] Y	0.86	-0.50	3836.00	3859.00	31
[illegible] Z	12.18	-0.14	3876.00	3617.00	1
[illegible] Z (SM)	10.46	-0.08	3877.00	3619.00	
[illegible] VEL	-1.23	-26.22	4179.00	38[illegible].00	29
SEAT X	1.39	-1.45	3845.00	389[illegible].00	32
SEAT Y	0.98	-0.93	3842.00	3849.00	33
SEAT Z	11.90	-0.13	3882.00	3609.00	34
SEAT Z (SM)	10.71	-0.07	3883.00	3610.00	
CHEST X	3.20	-1.45	3895.00	3920.00	5
CHEST Y	-0.12	-2.54	3876.00	3892.00	6
CHEST Z	16.25	-0.46	3898.00	3749.00	7
CHEST RES	16.63	0.86	3898.00	3709.00	
CHEST SI	31.63		3841.00	3942.00	
HEAD X	1.61	-2.55	3896.00	3943.00	2
HEAD Y	1.82	-1.27	3936.00	4009.00	3
HEAD Z	12.69	-0.50	3893.00	3641.00	4
HEAD RES	12.79	0.92	3893.00	3624.00	
HEAD SI	22.95		3845.00	4099.00	
HEAD HIC	18.54		3868.00	3939.00	
SHD REEL LF	23.25	1.62	3929.00	3879.00	14
SHD REEL LF	36.46	6.50	3933.00	3979.00	15
LF SHOULDER	58.43	10.60	3933.00	3879.00	
SHD REEL RT	27.23	8.14	3956.00	3875.00	15
SHD REEL RT	26.18	2.64	3934.00	3976.00	17
RT SHOULDER	48.04	12.40	3935.00	3877.00	
TOTAL SHD REEL	46.58	10.03	3945.00	3879.00	
TOTAL SHD REEL	62.54	9.36	3934.00	3979.00	
TOTAL SHOULDER	106.31	23.48	3934.00	3879.00	
TOTAL SHD / WT	0.72	0.16	3934.00	3879.00	
LF LAP BELT	34.93	11.47	3969.00	3875.00	8
RT LAP BELT	33.09	9.70	3979.00	3864.00	9
TOTAL LAP	67.60	22.40	3978.00	3876.00	
TOTAL LAP / WT	0.46	0.15	3978.00	3876.00	
CROTCH STRAP	82.73	21.34	3967.00	3910.00	10
LF SEAT LNK X	34.76	-178.98	4104.00	3891.00	18
RT SEAT LNK X	4.83	-94.78	3841.00	3891.00	19
TOTAL SEAT X	25.69	-273.76	4174.00	3891.00	
SEAT LNK Y	40.86	-66.09	3950.00	3889.00	35
LF SEAT PAN Z	413.64	24.16	3891.00	3657.00	11
RT SEAT PAN Z	348.60	22.04	3891.00	3628.00	12
CT SEAT PAN Z	845.42	54.54	3897.00	3619.00	13
TOTAL SEAT Z	1586.88	107.32	3894.00	3628.00	
TOTAL SEAT Z / WT	10.72	0.73	3894.00	3628.00	
RES SEAT FORCE	1609.17	108.37	3894.00	3620.00	
RES SEAT FORCE / WT	10.87	0.73	3894.00	3628.00	
LF FOOT X	17.25	-122.89	3845.00	3891.00	20
RT FOOT X	31.40	-50.54	3871.00	3891.00	23
CT FOOT X	21.54	-202.96	3845.00	3891.00	26
TOTAL FOOT X	59.62	-376.39	3845.00	3891.00	
LF FOOT Y	118.53	-8.12	3878.00	3835.00	21
RT FOOT Y	27.35	-96.00	3845.00	3893.00	24
CT FOOT Y	8.01	-67.64	3715.00	3896.00	27
TOTAL FOOT Y	43.87	-66.75	3864.00	3893.00	
LF FOOT Z	141.31	-28.52	3902.00	3837.00	22
RT FOOT Z	167.20	-7.35	3891.00	3955.00	25
CT FOOT Z	148.71	-86.40	3884.00	3854.00	28
TOTAL FOOT Z	384.16	-77.63	3887.00	3836.00	
RES FOOT FORCE	472.25	46.16	3896.00	3954.00	

DATA ID	MAX	MIN	T1	T2	
[illegible]	10.02	9.98	53.00	[illegible]	
[illegible] X	1.38	-1.02	3792.00	[illegible]	
CARR[illegible]	0.95	-0.81	3842.00	380[illegible]	
CARRIAGE Z	12.27	-0.15	3825.00	3659.00	
CARRIAGE Z (SM)	10.45	-0.06	3825.00	367[illegible]	
CARRIAGE [illegible]	-1.25	25.18	4168.00	37[illegible]	
SEAT X	2.28	-1.17	3793.00	36[illegible]	
SEAT Y	0.74	-1.24	3807.00	37[illegible]	
SEAT Z	11.28	-0.17	3830.00	365[illegible]	
SEAT Z [illegible]	10.57	-0.06	3832.00	365[illegible]	
CHEST X	3.93	-2.30	3843.00	386[illegible]	
CHEST Y	0.59	-1.05	3883.00	379[illegible]	
CHEST Z	16.84	-0.42	3849.00	368[illegible]	
CHEST RES	17.20	0.55	3849.00	3712.00	
CHEST SI	35.47		3787.00	39[illegible]	
HEAD X	1.52	-3.86	3838.00	385[illegible]	
HEAD Y	2.07	0.42	3896.00	385[illegible]	
HEAD Z	12.26	-1.87	3845.00	402[illegible]	5
HEAD RES	12.36	0.95	3845.00	408[illegible]	4
HEAD SI	18.62		3801.00	3961.00	
HEAD HIC	14.84		3819.00	38[illegible].00	
SHD REEL [illegible]	27.30	3.40	3883.00	383[illegible]	
SHD REEL [illegible]	36.33	4.79	3882.00	393[illegible].00	
LF SHOULDER	63.61	10.02	3882.00	3835.00	5
SHD REEL RT	32.39	6.33	4011.00	3829.00	15
SHD REEL RT	29.57	2.59	3893.00	3844.00	17
RT SHOULDER	48.15	10.91	3894.00	3835.00	
TOTAL SHLD REEL	52.19	10.45	3917.00	3832.00	
TOTAL SHLD REEL	62.06	8.12	3883.00	3842.00	
TOTAL SHOULDER	107.22	21.48	3883.00	3833.00	
TOTAL SHD / WT	0.67	0.13	3883.00	3833.00	
LF LAP BELT	30.88	6.39	4082.00	3825.00	
RT LAP BELT	39.50	11.52	3923.00	3827.00	6
TOTAL LAP	68.24	18.01	3932.00	3826.00	9
TOTAL LAP / WT	0.42	0.11	3932.00	3826.00	
CROTCH STRAP	118.66	-13.35	4036.00	3843.00	10
LF SEAT LNK X	12.42	-221.49	4190.00	3847.00	18
RT SEAT LNK X	6.22	-119.21	3794.00	3844.00	19
TOTAL SEAT X	-6.91	-340.70	3603.00	3847.00	
SEAT LNK Y	52.42	-70.33	3902.00	3846.00	35
LF SEAT PAN Z	516.41	38.26	3849.00	3606.00	11
RT SEAT PAN Z	467.73	32.48	3849.00	3645.00	12
CT SEAT PAN Z	751.20	41.95	3849.00	3613.00	13
TOTAL SEAT Z	1735.34	120.94	3849.00	3606.00	
TOTAL SEAT Z / WT	10.85	0.76	3849.00	3606.00	
RES SEAT FORCE	1767.23	122.20	3849.00	3606.00	
RES SEAT FORCE / WT	11.05	0.76	3849.00	3606.00	
LF FOOT X	22.93	-102.44	3793.00	3843.00	20
RT FOOT X	35.25	-62.56	3791.00	3842.00	23
CT FOOT X	23.93	-188.04	3793.00	3852.00	26
TOTAL FOOT X	77.11	-346.81	3793.00	3852.00	
LF FOOT Y	117.24	-6.80	3827.00	3782.00	21
RT FOOT Y	17.11	-119.55	3887.00	3843.00	24
CT FOOT Y	21.64	-42.43	3959.00	3803.00	27
TOTAL FOOT Y	62.78	-59.58	3813.00	3912.00	
LF FOOT Z	154.29	-27.55	3827.00	3805.00	22
RT FOOT Z	193.17	-12.46	3851.00	3960.00	25
CT FOOT Z	143.05	-68.44	3819.00	3803.00	28
TOTAL FOOT Z	391.60	-45.02	3835.00	3805.00	
RES FOOT FORCE	509.86	35.70	3851.00	3935.00	

NEG SHLD HAR AUG TEST: 459 SUBJ: M13 WT: 171.0 G: 10 GP: 1 CELL: 3

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.02	9.99	986.00	125.00	48
CARRIAGE X	1.81	-1.40	3839.00	3853.00	35
CARRIAGE Y	1.12	-1.07	3832.00	3853.00	31
CARRIAGE Z	12.16	-0.38	3871.00	3833.00	1
CARRIAGE Z (SM)	10.46	-0.19	3872.00	3765.00	
CARRIAGE VEL	-1.18	-26.14	4166.00	3835.00	29
SEAT X	2.13	-2.02	3841.00	3851.00	32
SEAT Y	1.49	-2.09	3838.00	3844.00	33
SEAT Z	11.07	-0.15	3876.00	3669.00	34
SEAT Z (SM)	10.47	-0.12	3880.00	36[illegible].00	
CHEST X	3.49	-2.04	3890.00	3938.00	5
CHEST Y	-0.31	-2.80	3877.00	3882.00	6
CHEST Z	16.55	-0.90	3897.00	3775.00	7
CHEST RES	16.69	0.92	3897.00	3623.00	
CHEST SI	29.09		3791.00	4109.00	
HEAD X	1.60	-2.31	3891.00	3945.00	2
HEAD Y	2.28	1.29	3972.00	3909.00	3
HEAD Z	12.76	-1.10	3891.00	3657.00	4
HEAD RES	12.94	1.73	3891.00	4114.00	
HEAD SI	18.29		3845.00	3977.00	
HEAD HIC	13.73		3852.00	3935.00	
SHD REEL LF	28.31	3.06	3948.00	3881.00	14
SHD REEL LF	47.52	3.25	3938.00	388[illegible].00	16
LF SHOULDER	74.69	6.37	3939.00	388[illegible]	
SHD REEL RT	35.19	11.63	3955.00	387[illegible]	15
SHD REEL RT	36.48	3.00	3936.00	38[illegible]	17
RT SHOULDER	71.16	15.51	3936.00	367[illegible]	
TOTAL SHLD REEL	82.45	15.66	3948.00	3880.00	
TOTAL SHLD REEL	83.32	6.51	3937.00	3883.[illegible]	
TOTAL SHOULDER	144.84	22.77	3937.00	3881.00	
TOTAL SHD / WT	0.85	0.13	3937.00	3881.00	
LF LAP BELT	38.74	7.02	3979.00	3881.00	8
RT LAP BELT	47.93	14.43	3969.00	3876.00	9
TOTAL LAP	84.98	21.88	3971.00	3880.00	
TOTAL LAP / WT	0.50	0.13	3971.00	3880.00	
CROTCH STRAP	119.85	27.57	4052.00	3891.00	10
LF SEAT LNK X	37.69	-193.91	4151.00	3891.00	18
RT SEAT LNK X	5.40	-108.35	4174.00	3885.00	19
TOTAL SEAT X	40.78	-297.66	4176.00	3885.00	
SEAT LNK Y	49.21	-75.36	4067.00	3886.00	35
LF SEAT PAN Z	415.40	30.49	3889.00	3613.00	11
RT SEAT PAN Z	349.24	28.53	3893.00	3600.00	12
CT SEAT PAN Z	954.79	51.75	3893.00	3601.00	13
TOTAL SEAT Z	1716.38	115.25	3892.00	3600.00	
TOTAL SEAT Z / WT	10.04	0.67	3892.00	3600.00	
RES SEAT FORCE	1743.29	116.54	3892.00	3600.00	
RES SEAT FORCE / WT	10.19	0.68	3892.00	3600.00	
LF FOOT X	31.35	-103.36	3839.00	3898.00	20
RT FOOT X	52.91	-62.53	3840.00	3898.00	23
CT FOOT X	56.19	-202.30	3840.00	3899.00	26
TOTAL FOOT X	137.74	-367.29	3840.00	3898.00	
LF FOOT Y	116.31	-3.35	3889.00	3850.00	21
RT FOOT Y	23.09	-114.46	3930.00	3872.00	24
CT FOOT Y	7.71	-50.14	3861.00	3849.00	27
TOTAL FOOT Y	66.07	-53.47	3877.00	3850.00	
LF FOOT Z	171.96	-80.52	3838.00	3851.00	22
RT FOOT Z	188.49	-25.41	3908.00	3849.00	25
CT FOOT Z	180.18	-137.10	3839.00	3832.00	28
TOTAL FOOT Z	422.47	-191.86	3901.00	3832.00	
RES FOOT FORCE	548.31	56.13	3898.00	3834.00	

NEG SHLD HAR ANG TEST: 492 SUBJ: P-3 WT: 202.0 G: 10 GP: 2 CELL: G

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	791.00	4011.00	48
CARRIAGE X	1.81	-1.69	3852.00	3845.00	36
CARRIAGE Y	0.64	-0.55	3872.00	3943.00	31
CARRIAGE Z	13.09	-0.22	3845.00	3750.00	1
CARRIAGE Z (SM)	10.71	-0.05	3846.00	3708.00	
CARRIAGE VEL	-0.98	-25.72	4180.00	3795.00	29
SEAT X	1.30	-1.82	3853.00	3845.00	32
SEAT Y	0.60	-1.01	3823.00	3917.00	33
SEAT Z	11.72	-0.19	3851.00	3601.00	34
SEAT Z (SM)	10.80	-0.09	3853.00	3600.00	
CHEST X	2.50	-2.81	3856.00	3904.00	5
CHEST Y	0.07	-2.67	3931.00	3871.00	6
CHEST Z	20.91	-0.82	3874.00	3701.00	7
CHEST RES	21.07	0.51	3874.00	3643.00	
CHEST SI	36.78		3807.00	3937.00	
HEAD X	.92	-2.98	3866.00	3900.00	2
HEAD Y	1.55	-0.40	3980.00	3952.00	3
HEAD Z	12.30	-1.05	3863.00	3693.00	4
HEAD RES	12.33	0.52	3863.00	4120.00	
HEAD SI	19.61		3817.00	3931.00	
HEAD HIC	17.00		3839.00	3906.00	
SHD REFL LF	43.26	4.51	3920.00	3850.00	14
SHD REEL LF	50.15	4.74	3903.00	3959.00	16
LF SHOULDER	79.54	14.20	3910.00	3862.00	
SHD REFL RT	60.45	14.99	3923.00	3856.00	15
SHD REEL RT	57.70	7.84	3903.00	3867.00	17
RT SHOULDER	107.33	25.17	3905.00	3858.00	
TOTAL SHLD REFL	103.17	22.64	3920.00	3857.00	
TOTAL SHLD REEL	107.85	15.07	3903.00	3867.00	
TOTAL SHOULDER	184.03	42.34	3905.00	3859.00	
TOTAL SHD / WT	0.91	0.21	3905.00	3859.00	
LF LAP BELT	79.43	27.24	3937.00	3872.00	8
RT LAP BELT	89.82	36.00	3931.00	3875.00	9
TOTAL LAP	167.99	64.03	3937.00	3873.00	
TOTAL LAP / WT	0.83	0.32	3937.00	3873.00	
CROTCH STRAP	173.09	-1.64	4059.00	3862.00	10
LF SEAT LNK X	53.84	-214.63	4177.00	3860.00	18
RT SEAT LNK X	28.40	-98.88	3914.00	3859.00	19
TOTAL SEAT X	57.53	-313.52	4196.00	3860.00	
SEAT LNK Y	73.38	-108.92	4056.00	3859.00	35
LF SEAT PAN Z	563.10	53.95	3861.00	3612.00	11
RT SEAT PAN Z	531.73	63.12	3867.00	3627.00	12
CT SEAT PAN Z	1093.86	118.85	3870.00	3609.00	13
TOTAL SEAT Z	2158.99	249.77	3869.00	3603.00	
TOTAL SEAT Z / WT	10.69	1.24	3869.00	3603.00	
RES SEAT FORCE	2180.35	251.79	3869.00	3603.00	
RES SEAT FORCE / WT	10.79	1.25	3869.00	3603.00	
LF FOOT X	13.83	-146.20	3810.00	3862.00	20
RT FOOT X	21.80	-91.87	3809.00	3873.00	23
CT FOOT X	12.29	-245.30	3811.00	3865.00	26
TOTAL FOOT X	39.95	-475.41	3811.00	3863.00	
LF FOOT Y	129.87	-7.27	3847.00	3953.00	21
RT FOOT Y	17.46	-141.39	3904.00	3866.00	24
CT FOOT Y	29.26	-46.38	3829.00	3865.00	27
TOTAL FOOT Y	57.55	-73.59	3904.00	3866.00	
LF FOOT Z	231.35	9.52	3849.00	3812.00	22
RT FOOT Z	239.80	-9.27	3865.00	3666.00	25
CT FOOT Z	217.22	-62.96	3853.00	3991.00	28
TOTAL FOOT Z	543.72	-31.72	3866.00	3802.00	
RES FOOT FORCE	701.91	53.74	3866.00	3813.00	

NEG SHLD HAR ANG TEST: 468 SUBJ: A-2 WT: 145.0 G: 10 GP: 1 CELL: [illegible]

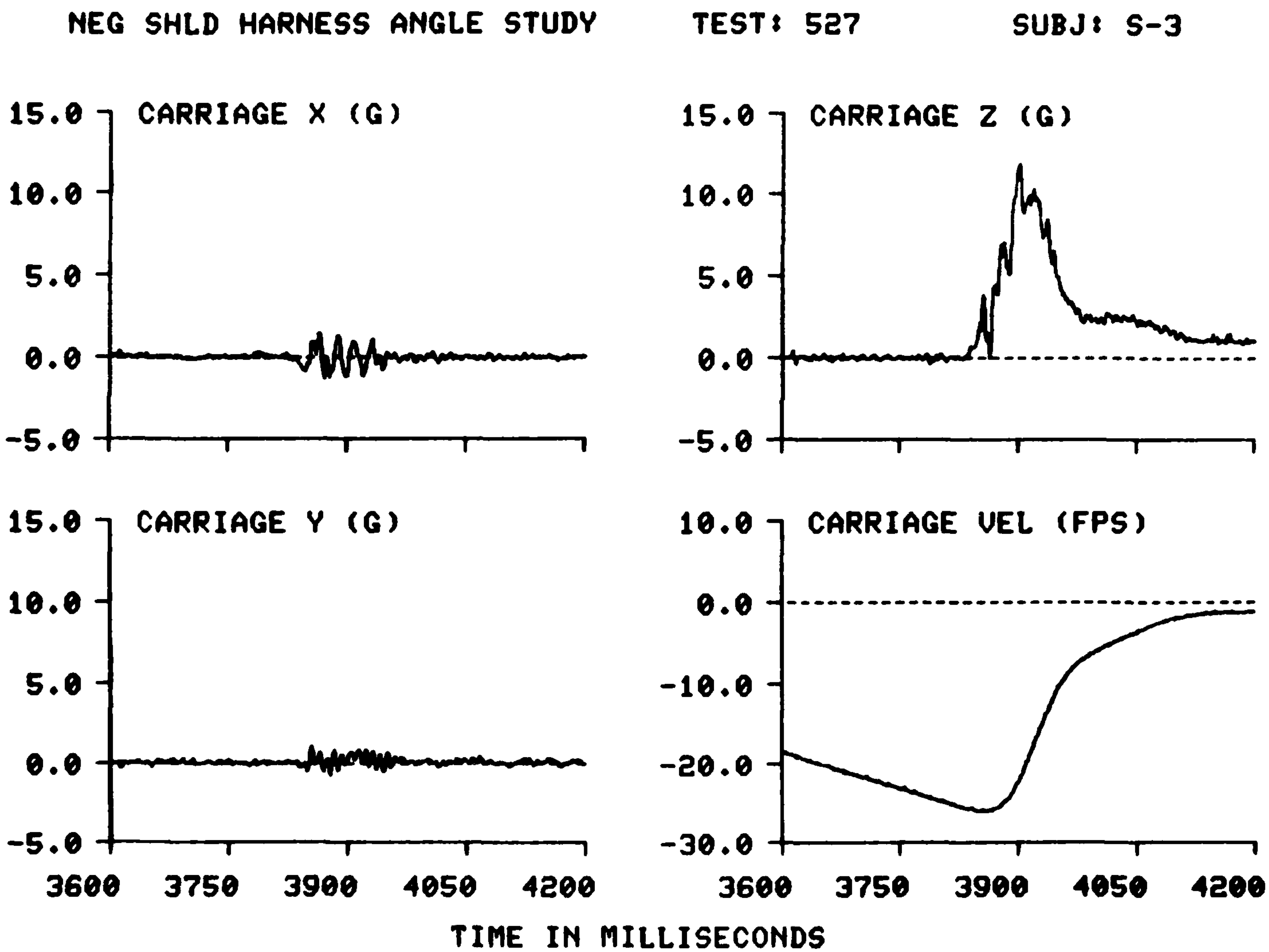
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.02	9.98	430.00	951.00	49
CARRIAGE X	1.39	-1.07	3857.00	3835.00	36
CARRIAGE Y	0.77	-0.65	3909.00	3872.00	31
CARRIAGE Z	12.15	-0.15	3888.00	3611.00	1
CARRIAGE Z (SM)	10.40	-0.05	3889.00	3700.00	
CARRIAGE VEL	-1.26	-26.19	4153.00	3845.00	29
SEAT X	1.75	-1.54	3859.00	3867.00	32
SEAT Y	0.77	-1.07	3856.00	3861.00	33
SEAT Z	11.61	-0.17	3895.00	3708.00	34
SEAT Z (SM)	10.57	-0.11	3896.00	3771.00	
CHEST X	4.93	-1.49	3912.00	3947.00	5
CHEST Y	-0.34	-2.58	3955.00	3924.00	6
CHEST Z	15.32	-0.63	3926.00	3802.00	7
CHEST RES	15.53	0.76	3926.00	3716.00	
CHEST SI	28.41		3851.00	4105.00	
HEAD X	.37	-4.12	3851.00	3951.00	2
HEAD Y	1.36	-0.28	3967.00	4108.00	3
HEAD Z	12.82	-0.61	3908.00	3732.00	4
HEAD RES	12.92	0.23	3909.00	4200.00	
HEAD SI	21.33		3857.00	4096.00	
HEAD HIC	16.28		3883.00	3942.00	
SHD REFL LF	29.23	2.12	3956.00	3891.00	14
SHD REEL LF	30.71	5.22	3943.00	3898.00	16
LF SHOULDER	57.12	8.68	3944.00	3891.00	
SHD REFL RT	29.08	7.19	3979.00	3869.00	15
SHD REEL RT	29.16	5.92	3957.00	3903.00	17
RT SHOULDER	53.78	14.53	3960.00	3890.00	
TOTAL SHLD REFL	57.47	9.64	3990.00	3890.00	
TOTAL SHLD REEL	59.15	12.34	3944.00	3901.00	
TOTAL SHOULDER	108.69	23.26	3944.00	3890.00	
TOTAL SHD / WT	0.75	0.16	3944.00	3890.00	
LF LAP BELT	39.39	8.08	3985.00	3925.00	8
RT LAP BELT	43.87	6.41	3983.00	3900.00	9
TOTAL LAP	83.00	17.17	3984.00	3899.00	
TOTAL LAP / WT	0.57	0.12	3984.00	3899.00	
CROTCH STRAP	65.80	-8.77	3979.00	3906.00	10
LF SEAT LNK X	54.90	-124.27	4110.00	3903.00	18
RT SEAT LNK X	45.80	-63.04	3960.00	3911.00	19
TOTAL SEAT X	80.11	-179.24	3973.00	3911.00	
SEAT LNK Y	67.50	-2.38	3960.00	3901.00	35
LF SEAT PAN Z	313.79	27.80	3905.00	3640.00	11
RT SEAT PAN Z	418.34	23.05	3912.00	3601.00	12
CT SEAT PAN Z	901.77	83.12	3913.00	3620.00	13
TOTAL SEAT Z	1621.90	140.50	3913.00	3620.00	
TOTAL SEAT Z / WT	11.19	0.97	3913.00	3620.00	
RES SEAT FORCE	1630.49	147.32	3913.00	3620.00	
RES SEAT FORCE / WT	11.24	1.02	3913.00	3620.00	
LF FOOT X	22.51	-139.33	3858.00	3907.00	20
RT FOOT X	45.12	-72.08	3895.00	3906.00	23
CT FOOT X	36.65	-207.52	3858.00	3905.00	26
TOTAL FOOT X	96.35	-417.13	3858.00	3906.00	
LF FOOT Y	123.68	-4.72	3890.00	3847.00	21
RT FOOT Y	20.84	-112.26	3858.00	3906.00	24
CT FOOT Y	8.17	-87.06	3878.00	3909.00	27
TOTAL FOOT Y	67.57	-71.61	3878.00	3908.00	
LF FOOT Z	159.94	-32.34	3914.00	3849.00	22
RT FOOT Z	225.10	-29.92	3914.00	3887.00	25
CT FOOT Z	145.87	-103.16	3912.00	3869.00	28
TOTAL FOOT Z	484.84	-126.68	3914.00	3869.00	
RES FOOT FORCE	620.83	13.80	3914.00	3861.00	

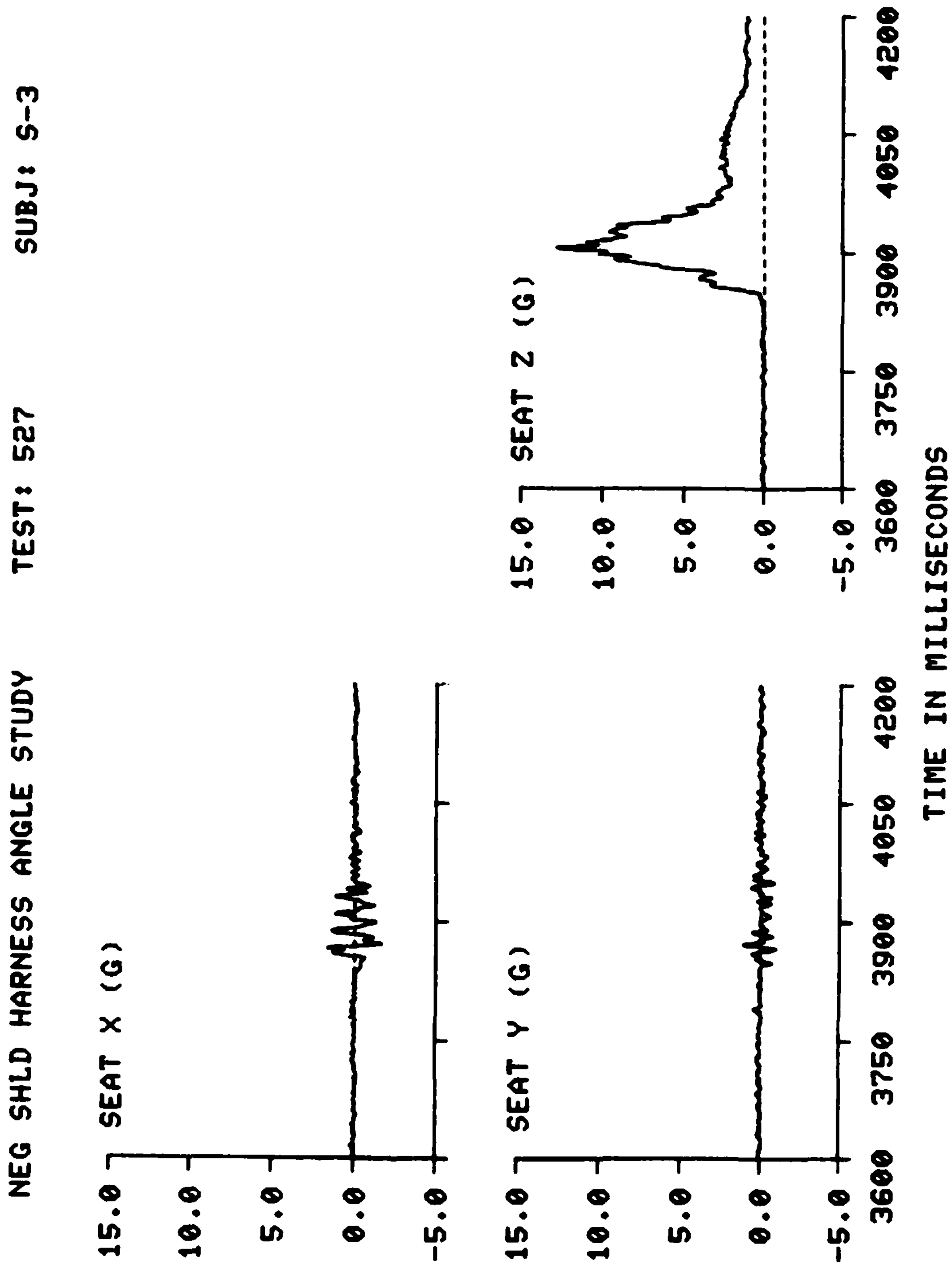
NEG SHLD HAR ANG TEST: 464 SUBJ: A-3 WT: 147.0 G: 10 GP: 1 CELL: 3

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.02	9.98	531.00	979.00	48
CARRIAGE X	1.76	-1.24	3879.00	3835.00	36
CARRIAGE Y	1.03	-1.14	3870.00	3864.00	31
CARRIAGE Z	12.70	-0.25	3909.00	3806.00	1
CARRIAGE Z (SM)	10.60	-0.11	3910.00	3804.00	
CARRIAGE VEL	-1.30	-26.23	4193.00	3871.00	29
SEAT X	1.58	-1.48	3917.00	3922.00	32
SEAT Y	1.07	-1.38	3877.00	3862.00	33
SEAT Z	11.30	-0.13	3920.00	3723.00	34
SEAT Z (SM)	10.55	-0.10	3918.00	3722.00	
CHEST X	4.13	-1.39	3941.00	3968.00	5
CHEST Y	0.16	-2.20	3924.00	3933.00	6
CHEST Z	21.53	-0.95	3930.00	3695.00	7
CHEST RES	21.72	0.97	3931.00	3868.00	
CHEST SI	35.67		3873.00	3999.00	
HEAD X	0.98	-3.95	3923.00	3965.00	2
HEAD Y	2.75	1.42	4002.00	3956.00	3
HEAD Z	12.20	-1.43	3929.00	3720.00	4
HEAD RES	12.43	1.78	3929.00	4149.00	
HEAD SI	17.40		3885.00	4019.00	
HEAD HIC	12.98		3890.00	3993.00	
SHD REFL LF	38.22	6.72	4004.00	3916.00	14
SHD REEL LF	37.07	13.03	3965.00	3934.00	16
LF SHOULDER	71.18	21.00	3971.00	3916.00	
SHD REFL RT	31.50	16.55	3978.00	3926.00	15
SHD REEL RT	42.10	12.72	3976.00	4055.00	17
RT SHOULDER	73.26	30.19	3977.00	3928.00	
TOTAL SHLD REFL	66.57	24.63	4014.00	3926.00	
TOTAL SHLD REEL	78.49	26.62	3966.00	3931.00	
TOTAL SHOULDER	142.36	52.24	3971.00	3927.00	
TOTAL SHD / WT	0.97	0.36	3971.00	3927.00	
LF LAP BELT	47.84	13.12	3998.00	3929.00	8
RT LAP BELT	59.82	16.03	4002.00	3943.00	9
TOTAL LAP	107.31	31.82	3999.00	3937.00	
TOTAL LAP / WT	0.73	0.22	3999.00	3937.00	
CROTCH STRAP	89.21	-25.31	4011.00	3929.00	10
LF SEAT LNK X	34.91	-133.89	4151.00	3923.00	18
RT SEAT LNK X	6.79	-96.51	4180.00	3931.00	19
TOTAL SEAT X	39.24	-227.94	4151.00	3923.00	
SEAT LNK Y	48.37	-39.74	4016.00	3927.00	35
LF SEAT PAN Z	385.54	35.94	3934.00	3611.00	11
RT SEAT PAN Z	507.87	63.75	3934.00	3602.00	12
CT SEAT PAN Z	765.46	72.23	3933.00	3609.00	13
TOTAL SEAT Z	1657.26	178.71	3933.00	3608.00	
TOTAL SEAT Z / WT	11.27	1.22	3933.00	3608.00	
RES SEAT FORCE	1672.95	179.21	3933.00	3602.00	
RES SEAT FORCE / WT	11.38	1.22	3933.00	3602.00	
LF FOOT X	17.76	-95.26	3880.00	3936.00	20
RT FOOT X	35.79	-48.80	3877.00	3936.00	23
CT FOOT X	19.18	-161.50	3879.00	3922.00	26
TOTAL FOOT X	63.03	-305.55	3880.00	3936.00	
LF FOOT Y	115.18	-13.22	3910.00	3888.00	21
RT FOOT Y	26.25	-96.21	3879.00	3927.00	24
CT FOOT Y	21.91	-46.62	4047.00	3927.00	27
TOTAL FOOT Y	52.74	-74.49	3878.00	3886.00	
LF FOOT Z	158.38	-61.70	3877.00	3871.00	22
RT FOOT Z	143.25	-16.75	3925.00	3870.00	25
CT FOOT Z	184.82	-117.12	3877.00	3890.00	28
TOTAL FOOT Z	398.35	-163.99	3877.00	3871.00	
RES FOOT FORCE	404.62	15.10	3877.00	3694.00	

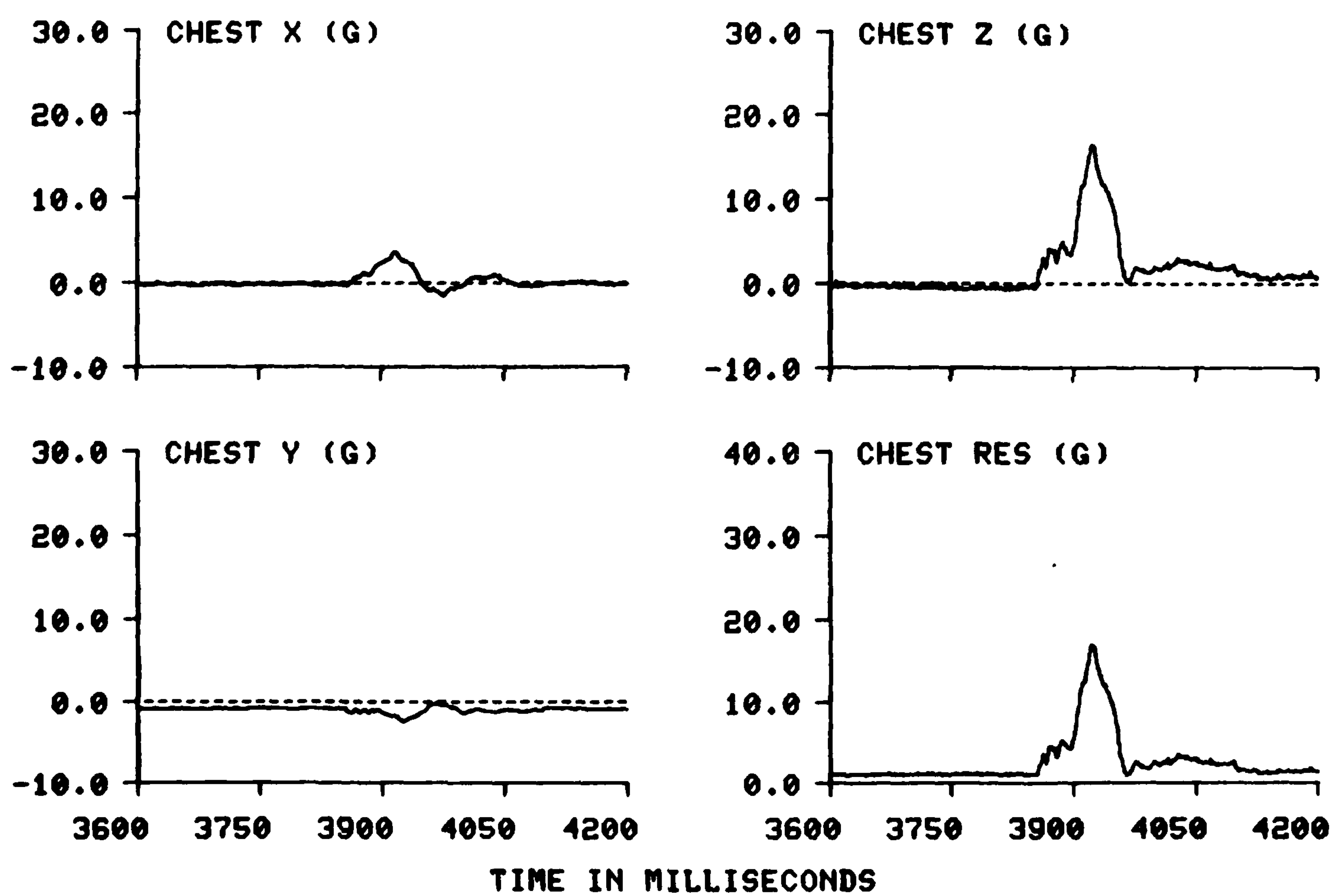
NEG SHLD HAR RNG TEST: 527 SUBJ: S-3 WT: 170.0 G: 10 GP: 1 CELL: 3

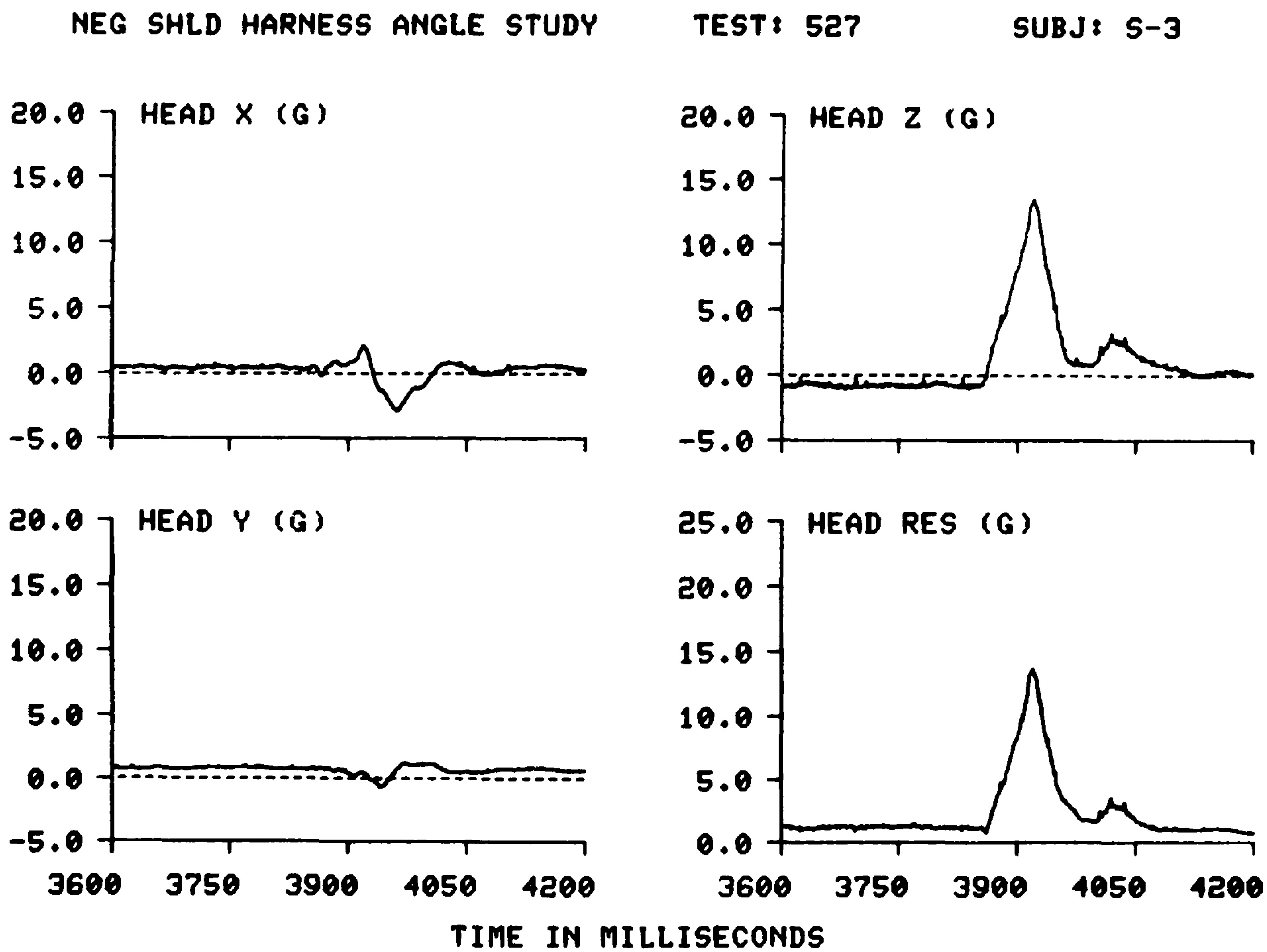
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	785.00	852.00	48
CARRIAGE X	1.51	-1.28	3864.00	3871.00	36
CARRIAGE Y	1.05	-0.81	3855.00	3879.00	31
CARRIAGE Z	11.84	-0.37	3901.00	3787.00	1
CARRIAGE Z (SM)	10.99	-0.11	3900.00	3790.00	
CARRIAGE VEL	-1.05	-26.13	4150.00	3843.00	29
SEAT X	1.64	-1.67	3866.00	3871.00	32
SEAT Y	1.05	-1.00	3872.00	3857.00	33
SEAT Z	12.81	-0.21	3906.00	3705.00	34
SEAT Z (SM)	11.46	-0.10	3906.00	3705.00	
CHEST X	3.77	-1.52	3916.00	3976.00	5
CHEST Y	-0.25	-2.52	3967.00	3925.00	6
CHEST Z	16.44	-0.77	3922.00	3755.00	7
CHEST RES	16.87	0.87	3922.00	3739.00	
CHEST SI	30.76		3857.00	3963.00	
HEAD X	2.09	-2.88	3919.00	3961.00	2
HEAD Y	1.23	-0.67	3995.00	3941.00	3
HEAD Z	13.46	-1.06	3920.00	3690.00	4
HEAD RES	13.63	0.67	3920.00	4194.00	
HEAD SI	20.07		3865.00	3987.00	
HEAD HIC	16.48		3886.00	3948.00	
SHD REFL LF	27.39	5.04	3980.00	3915.00	14
SHD REEL LF	31.06	4.05	3975.00	3916.00	16
LF SHOULDER	55.94	9.09	3979.00	3916.00	
SHD REFL RT	31.17	7.21	3993.00	3909.00	15
SHD REEL RT	45.85	2.09	3967.00	3913.00	17
RT SHOULDER	72.22	10.33	3968.00	3910.00	
TOTAL SHLD REFL	57.13	13.36	3980.00	3908.00	
TOTAL SHLD REEL	72.82	6.96	3969.00	3915.00	
TOTAL SHOULDER	123.68	23.44	3970.00	3913.00	
TOTAL SHD / WT	0.73	0.14	3970.00	3913.00	
LF LAP BELT	38.57	16.84	3987.00	3900.00	8
RT LAP BELT	30.92	8.34	3984.00	3907.00	9
TOTAL LAP	68.63	26.63	3985.00	3908.00	
TOTAL LAP / WT	0.40	0.16	3985.00	3908.00	
CROTCH STRAP	109.23	-18.90	3982.00	3914.00	10
LF SEAT LNK X	47.22	-232.78	3758.00	3916.00	18
RT SEAT LNK X	35.27	-68.65	3956.00	3921.00	19
TOTAL SEAT X	36.65	-297.89	3688.00	3914.00	
SEAT LNK Y	48.30	-112.13	4160.00	3925.00	35
LF SEAT PAN Z	560.92	56.39	3915.00	3601.00	11
RT SEAT PAN Z	479.62	34.66	3916.00	3607.00	12
CT SEAT PAN Z	868.45	72.56	3918.00	3605.00	13
TOTAL SEAT Z	1897.34	174.59	3917.00	3605.00	
TOTAL SEAT Z / WT	11.16	1.03	3917.00	3605.00	
RES SEAT FORCE	1923.01	177.27	3917.00	3605.00	
RES SEAT FORCE / WT	11.31	1.04	3917.00	3605.00	
LF FOOT X	22.71	-139.13	3890.00	3921.00	20
RT FOOT X	49.86	-49.72	3861.00	3896.00	23
CT FOOT X	27.12	-193.80	3866.00	3920.00	26
TOTAL FOOT X	88.92	-355.24	3861.00	3920.00	
LF FOOT Y	86.61	-19.08	3910.00	3674.00	21
RT FOOT Y	16.91	-103.78	3865.00	3928.00	24
CT FOOT Y	64.72	-54.54	3937.00	3905.00	27
TOTAL FOOT Y	78.45	-55.54	3938.00	3900.00	
LF FOOT Z	172.64	-81.70	3930.00	3899.00	22
RT FOOT Z	174.15	-57.25	3910.00	3876.00	25
CT FOOT Z	330.95	-90.83	3910.00	3875.00	28
TOTAL FOOT Z	567.24	-226.10	3910.00	3876.00	
RES FOOT FORCE	585.10	15.92	3910.00	4009.00	

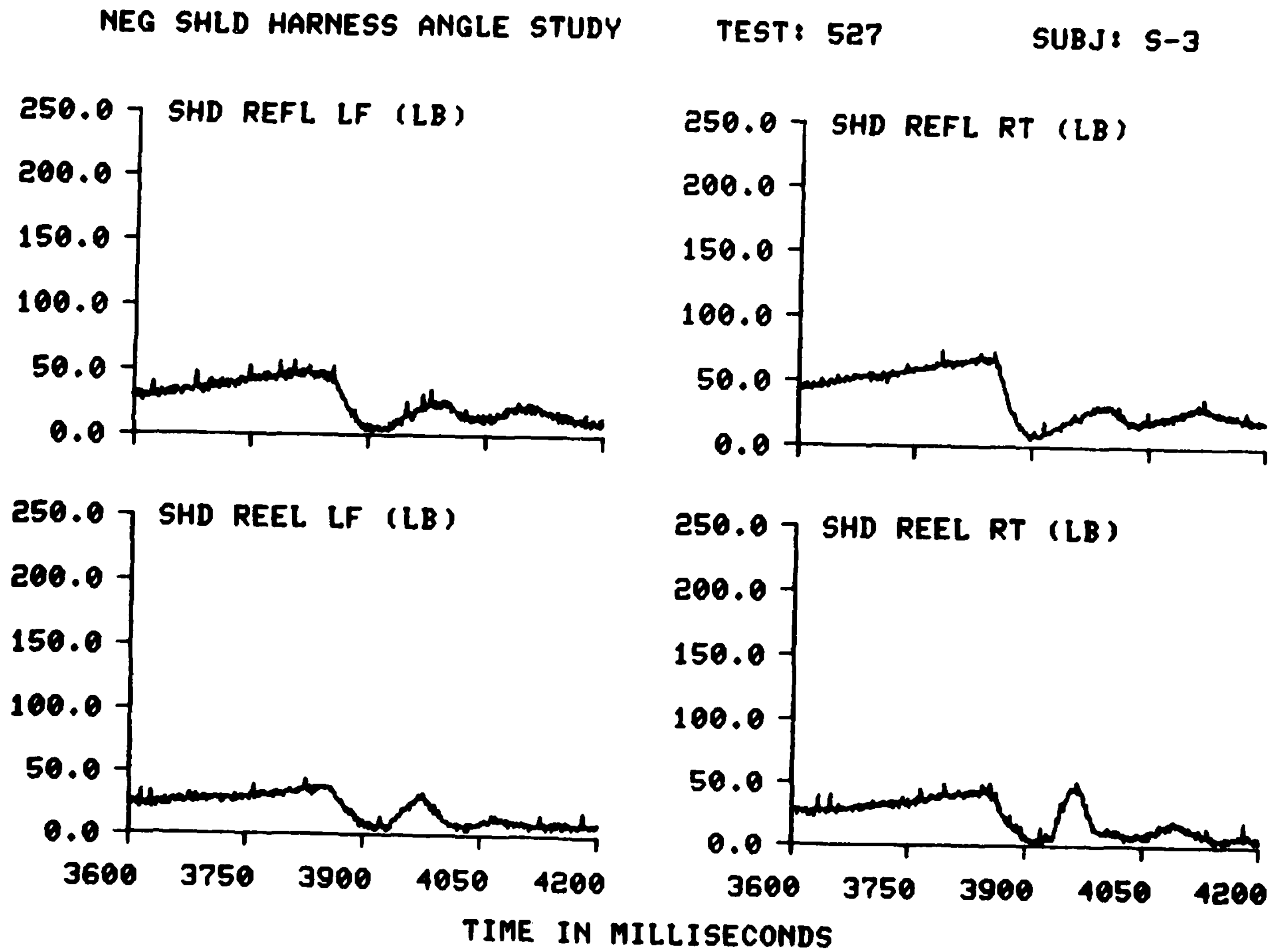

NEG SHLD HARNESS ANGLE STUDY
TEST: 527
SUBJ: S-3
CARRIAGE X (G)
CARRIAGE Z (G)
CARRIAGE Y (G)
CARRIAGE VEL (FPS)
15.0
10.0
5.0
0.0
-5.0
-10.0
-20.0
-30.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

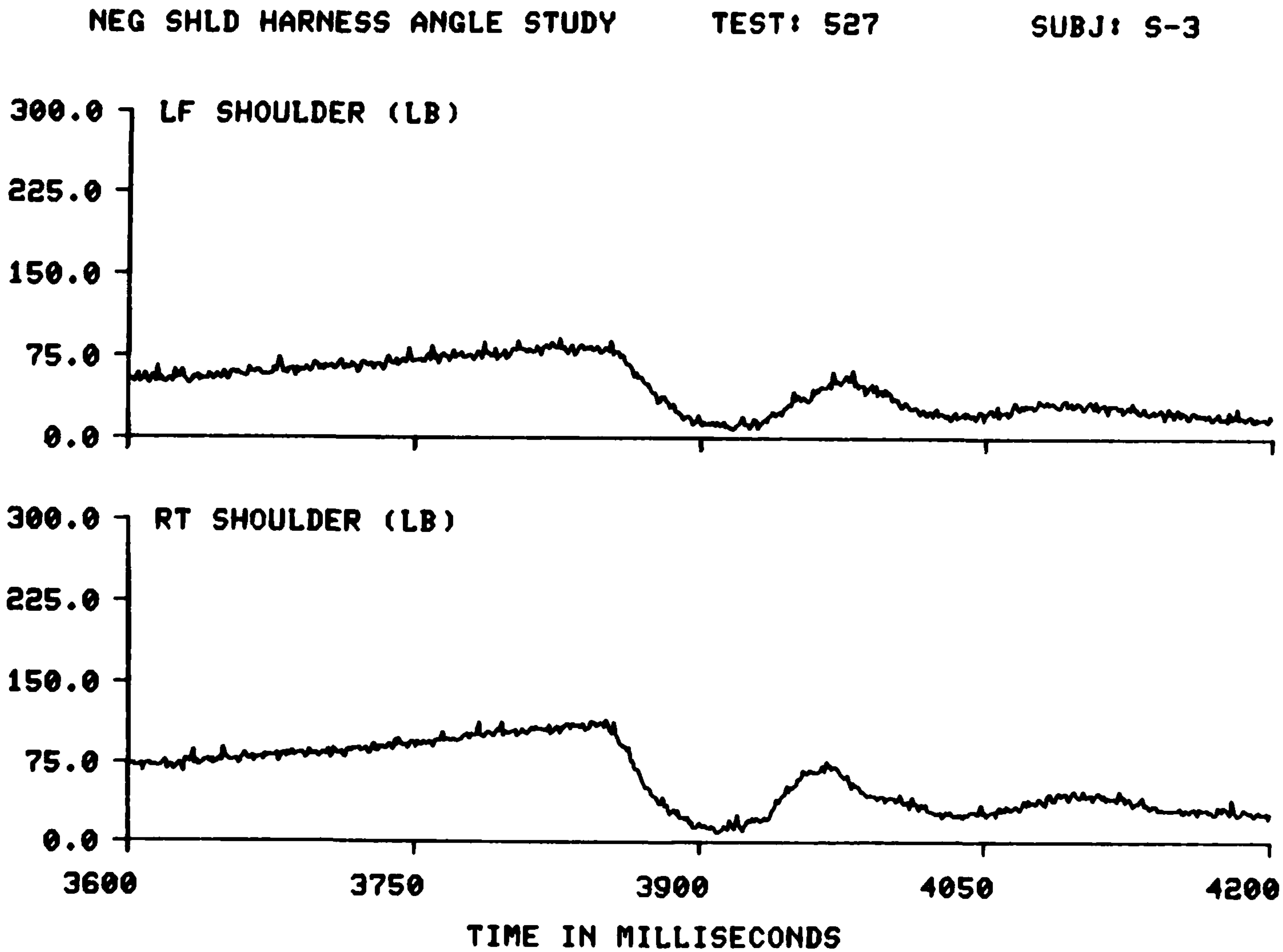

NEG SHLD HARNESS ANGLE STUDY
TEST: 527
SUBJ: S-3
SEAT X (G)
SEAT Y (G)
SEAT Z (G)
15.0
10.0
5.0
0.0
-5.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

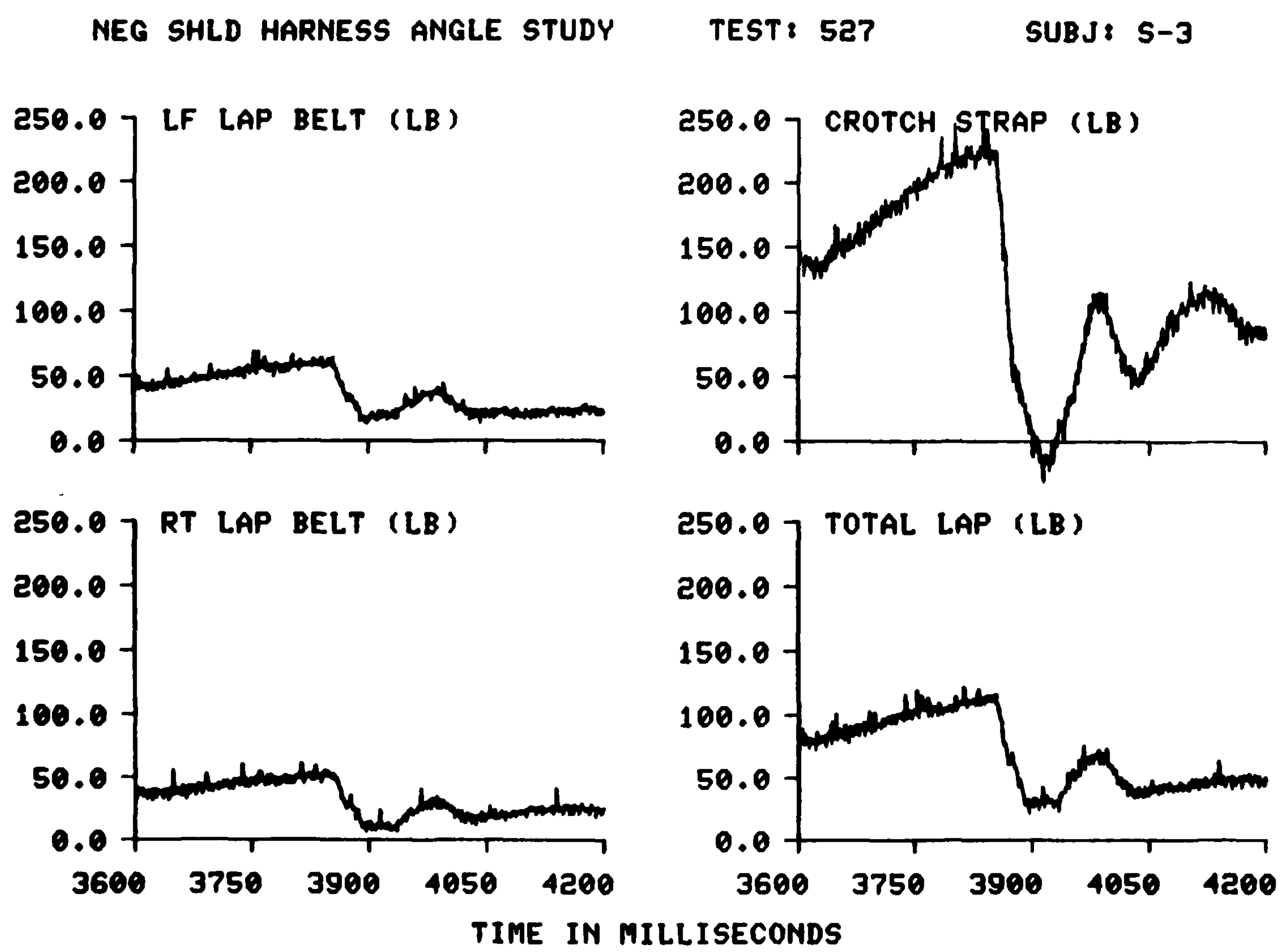
NEG SHLD HARNESS ANGLE STUDY TEST: 527 SUBJ: S-3

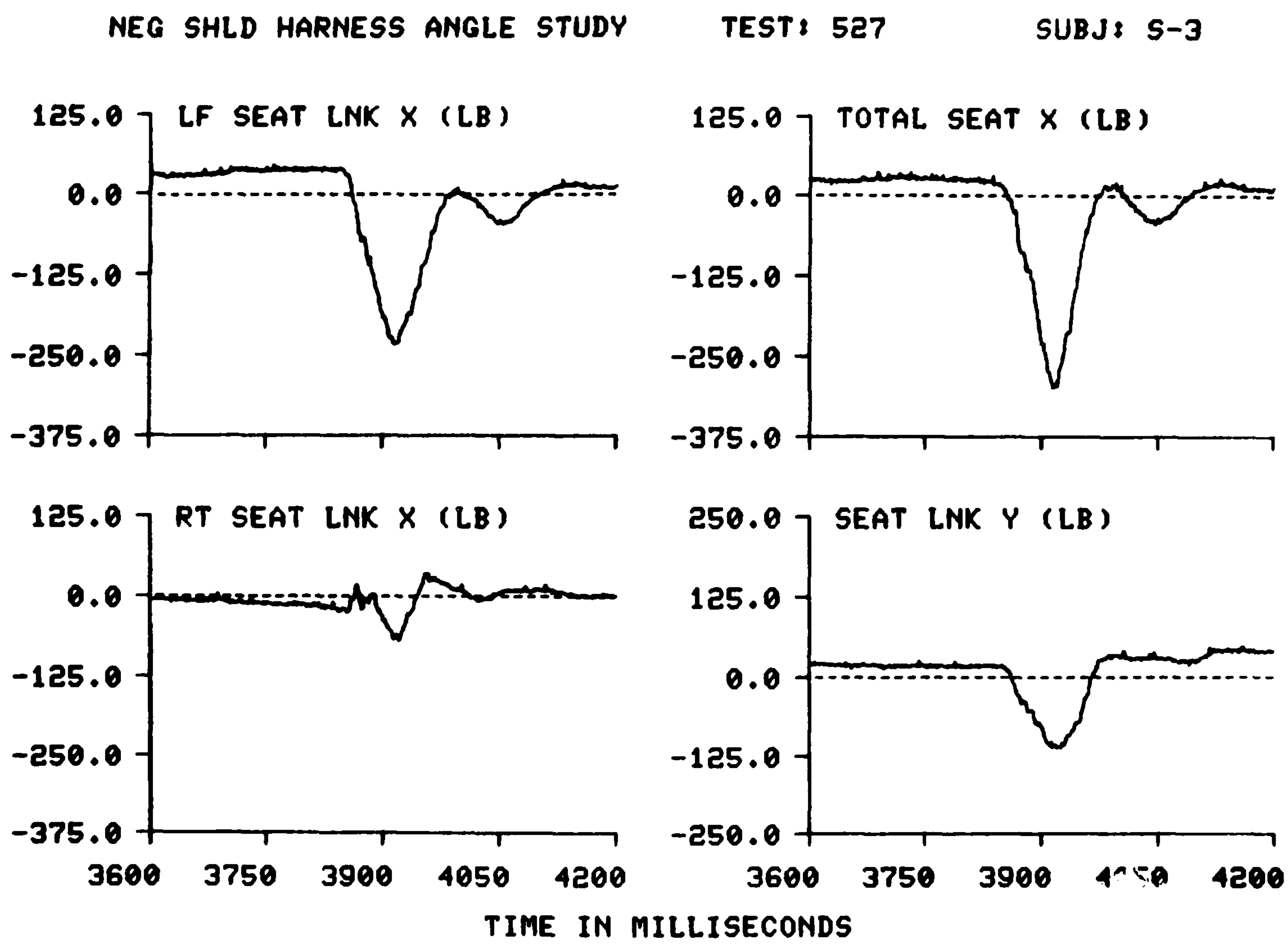



NEG SHLD HARNESS ANGLE STUDY
TEST: 527
SUBJ: S-3
HEAD X (G)
HEAD Z (G)
HEAD Y (G)
HEAD RES (G)
20.0
15.0
10.0
5.0
0.0
-5.0
25.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

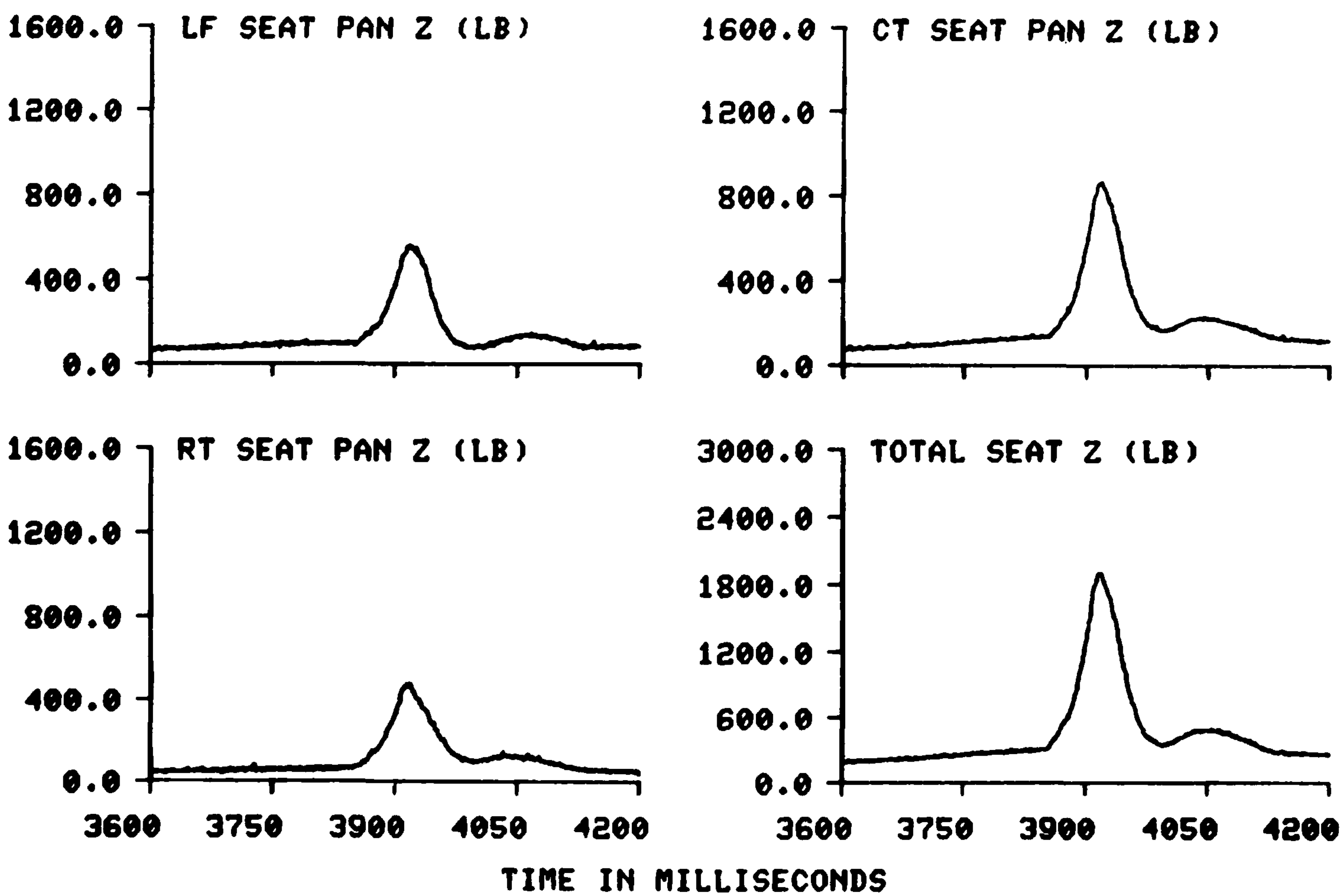

NEG SHLD HARNESS ANGLE STUDY
TEST: 527
SUBJ: S-3
SHD REFL LF (LB)
SHD REFL RT (LB)
SHD REEL LF (LB)
SHD REEL RT (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

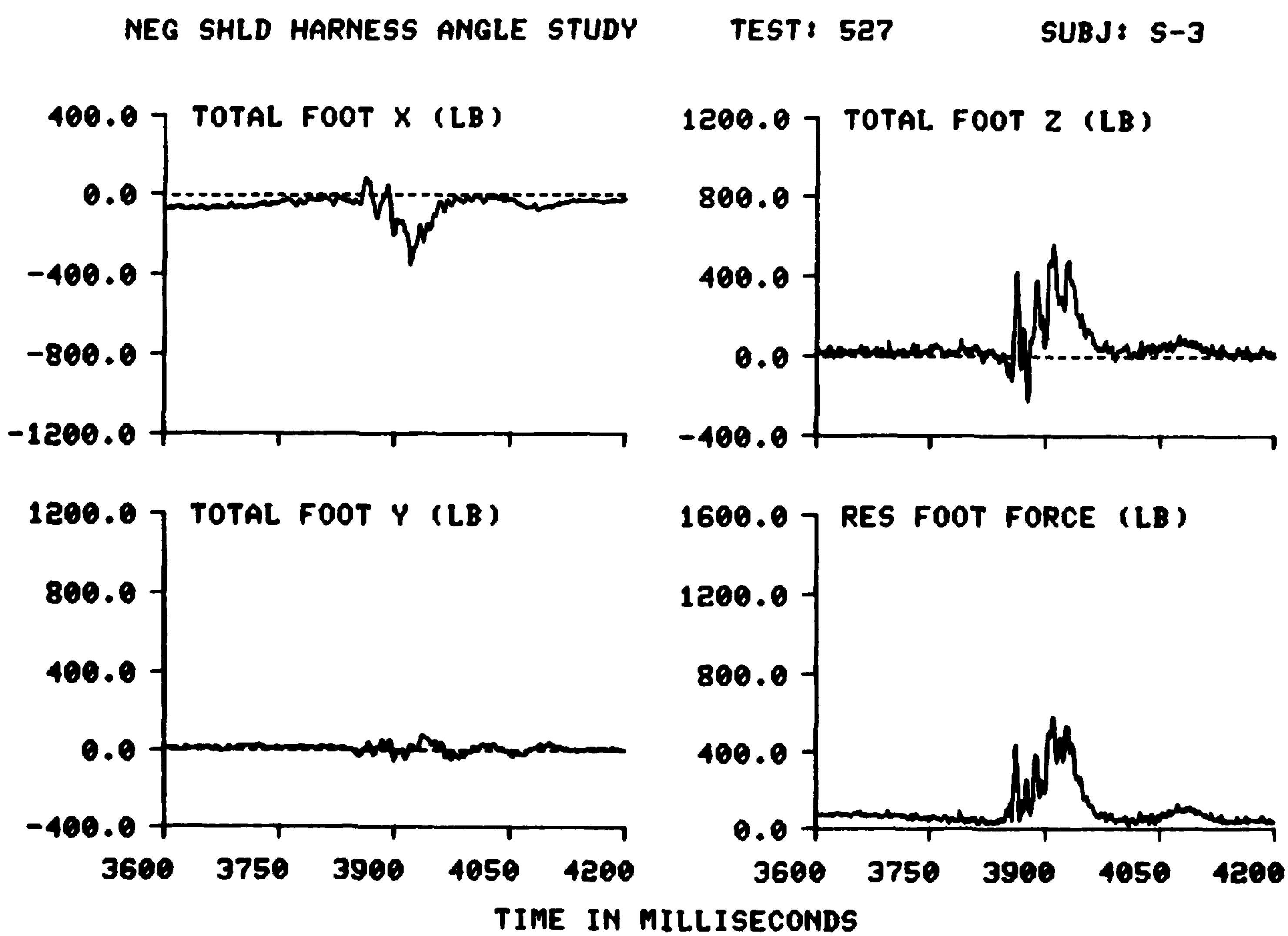

NEG SHLD HARNESS ANGLE STUDY
TEST: 527
SUBJ: S-3
LF SHOULDER (LB)
300.0
225.0
150.0
75.0
0.0
RT SHOULDER (LB)
300.0
225.0
150.0
75.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


NEG SHLD HARNESS ANGLE STUDY
TEST: 527
SUBJ: S-3
LF LAP BELT (LB)
CROTCH STRAP (LB)
RT LAP BELT (LB)
TOTAL LAP (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


NEG SHLD HARNESS ANGLE STUDY
TEST: 527
SUBJ: S-3
LF SEAT LNK X (LB)
TOTAL SEAT X (LB)
RT SEAT LNK X (LB)
SEAT LNK Y (LB)
125.0
0.0
-125.0
-250.0
-375.0
250.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

NEG SHLD HARNESS ANGLE STUDY TEST: 527 SUBJ: S-3




NEG SHLD HARNESS ANGLE STUDY
TEST: 527
SUBJ: S-3
TOTAL FOOT X (LB)
400.0
0.0
-400.0
-800.0
-1200.0
TOTAL FOOT Z (LB)
1200.0
800.0
400.0
0.0
-400.0
TOTAL FOOT Y (LB)
1200.0
800.0
400.0
0.0
-400.0
RES FOOT FORCE (LB)
1600.0
1200.0
800.0
400.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

NEG SHLD HAR ANG TEST: 528 SUBJ: F-3 WT: 158.0 G: 10 GP: 1 CELL: H

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	610.00	605.00	48
CARRIAGE X	1.98	-1.55	3797.00	3830.00	36
CARRIAGE Y	1.04	-1.18	3789.00	3783.00	31
CARRIAGE Z	11.86	-0.42	3831.00	3723.00	1
CARRIAGE Z (SM)	10.97	-0.13	3831.00	3723.00	
CARRIAGE VEL	-1.05	-26.11	4139.00	3791.00	29
SEAT X	2.24	-1.64	3798.00	3807.00	32
SEAT Y	1.43	-1.70	3795.00	3800.00	33
SEAT Z	12.51	-0.22	3838.00	3638.00	34
SEAT Z (SM)	11.46	-0.12	3839.00	3638.00	
CHEST X	2.04	-2.12	3807.00	3881.00	5
CHEST Y	-0.59	-2.68	3827.00	3849.00	6
CHEST Z	15.64	-0.96	3861.00	3748.00	7
CHEST RES	15.73	1.01	3861.00	3781.00	
CHEST SI	28.38		3795.00	3928.00	
HEAD X	2.17	-1.89	3834.00	3883.00	2
HEAD Y	2.75	0.25	3914.00	3857.00	3
HEAD Z	13.18	-1.27	3849.00	3607.00	4
HEAD RES	13.26	1.37	3849.00	4014.00	
HEAD SI	20.88		3805.00	3924.00	
HEAD HIC	18.01		3825.00	3887.00	
SHD REFL LF	46.40	10.84	3866.00	4071.00	14
SHD REEL LF	43.31	3.20	3880.00	3839.00	16
LF SHOULDER	85.99	22.20	3879.00	4096.00	
SHD REFL RT	47.82	22.08	3861.00	4100.00	15
SHD REEL RT	60.34	10.38	3876.00	3843.00	17
RT SHOULDER	102.40	46.51	3875.00	4094.00	
TOTAL SHLD REFL	92.82	34.03	3865.00	4094.00	
TOTAL SHLD REEL	102.05	13.93	3879.00	3842.00	
TOTAL SHOULDER	186.08	69.18	3878.00	4095.00	
TOTAL SHD / WT	1.18	0.44	3878.00	4095.00	
LF LAP BELT	54.11	18.72	3930.00	3844.00	8
RT LAP BELT	68.35	20.88	3925.00	3840.00	9
TOTAL LAP	119.18	42.53	3927.00	3843.00	
TOTAL LAP / WT	0.75	0.27	3927.00	3843.00	
CROTCH STRAP	99.33	-9.92	3933.00	3859.00	10
LF SEAT LNK X	47.32	-217.70	4075.00	3849.00	18
RT SEAT LNK X	55.68	-39.01	3799.00	3849.00	19
TOTAL SEAT X	67.65	-256.70	3759.00	3849.00	
SEAT LNK Y	43.08	-118.56	3785.00	3844.00	35
LF SEAT PAN Z	486.12	29.86	3846.00	3602.00	11
RT SEAT PAN Z	374.62	30.28	3850.00	4198.00	12
CT SEAT PAN Z	788.57	56.37	3848.00	3605.00	13
TOTAL SEAT Z	1642.26	135.11	3848.00	3600.00	
TOTAL SEAT Z / WT	10.39	0.86	3848.00	3600.00	
RES SEAT FORCE	1665.94	147.47	3848.00	3603.00	
RES SEAT FORCE / WT	10.54	0.93	3848.00	3603.00	
LF FOOT X	-0.98	-170.95	3798.00	3831.00	20
RT FOOT X	26.28	-83.87	3795.00	3831.00	23
CT FOOT X	8.80	-241.64	3799.00	3832.00	26
TOTAL FOOT X	21.76	-493.77	3799.00	3831.00	
LF FOOT Y	142.55	-10.31	3838.00	3926.00	21
RT FOOT Y	25.83	-87.96	3798.00	3847.00	24
CT FOOT Y	5.59	-75.40	3801.00	3844.00	27
TOTAL FOOT Y	44.47	-75.71	3873.00	3845.00	
LF FOOT Z	190.86	-2.92	3840.00	3809.00	22
RT FOOT Z	203.24	22.39	3839.00	4152.00	25
CT FOOT Z	205.28	-190.23	3798.00	3810.00	28
TOTAL FOOT Z	562.33	-122.31	3840.00	3809.00	
RES FOOT FORCE	627.41	113.20	3840.00	4180.00	

NEG SHLD HAR ANG TEST: 498 SUBJ: F-2 WT: 161.0 G: 10 GP: 1 CELL: -

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	808.00	2275.00	48
CARRIAGE X	1.58	-1.48	3380.00	3887.00	36
CARRIAGE Y	0.77	-0.55	3882.00	3866.00	31
CARRIAGE Z	12.52	-0.47	3912.00	3832.00	1
CARRIAGE Z (SM)	10.44	-0.16	3912.00	3834.00	
CARRIAGE VEL	-1.18	-25.89	4157.00	3870.00	29
SEAT X	1.03	-1.02	3921.00	3950.00	32
SEAT Y	0.79	-1.09	4023.00	3886.00	33
SEAT Z	11.78	-0.18	3918.00	3745.00	34
SEAT Z (SM)	10.66	-0.13	3919.00	3744.00	
CHEST X	4.24	-1.84	3935.00	3970.00	5
CHEST Y	-0.42	-2.38	3897.00	3939.00	6
CHEST Z	16.98	-0.76	3935.00	4026.00	7
CHEST RES	17.63	0.67	3935.00	3766.00	
CHEST SI	37.12		3877.00	4017.00	
HEAD X	3.03	-2.94	3936.00	3972.00	2
HEAD Y	2.29	0.62	4016.00	3927.00	3
HEAD Z	13.13	-2.10	3936.00	4027.00	4
HEAD RES	13.48	1.56	3936.00	4139.00	
HEAD SI	21.39		3889.00	3998.00	
HEAD HIC	17.63		3906.00	3975.00	
SHD REFL LF	35.34	8.25	3958.00	4019.00	14
SHD REEL LF	45.97	0.39	3967.00	3925.00	16
LF SHOULDER	77.38	19.36	3968.00	4004.00	
SHD REFL RT	50.72	11.09	3956.00	402[illegible]	15
SHD REEL RT	67.07	2.07	3966.00	3926.00	17
RT SHOULDER	112.19	25.27	3965.00	4054.00	
TOTAL SHLD REFL	85.89	19.46	3957.00	4020.00	
TOTAL SHLD REEL	112.85	2.55	3966.00	3925.00	
TOTAL SHOULDER	188.54	47.00	3966.00	4062.00	
TOTAL SHD / WT	1.17	0.29	3966.00	4062.00	
LF LAP BELT	53.46	26.98	4006.00	3914.00	8
RT LAP BELT	80.03	29.77	4024.00	3921.00	9
TOTAL LAP	112.72	58.48	4006.00	3921.00	
TOTAL LAP / WT	0.70	0.36	4006.00	3921.00	
CROTCH STRAP	117.39	-9.25	4022.00	3940.00	10
LF SEAT LNK X	12.43	-258.92	3730.00	3933.00	18
RT SEAT LNK X	3.98	-128.83	3644.00	3932.00	19
TOTAL SEAT X	6.58	-385.45	3664.00	3932.00	
SEAT LNK Y	29.23	-134.84	4197.00	3933.00	35
LF SEAT PAN Z	573.15	30.31	3933.00	3628.00	11
RT SEAT PAN Z	486.46	31.67	3932.00	3613.00	12
CT SEAT PAN Z	579.40	24.45	3937.00	3601.00	13
TOTAL SEAT Z	1625.27	101.37	3935.00	3613.00	
TOTAL SEAT Z / WT	10.09	0.63	3935.00	3613.00	
RES SEAT FORCE	1675.75	101.70	3935.00	3613.00	
RES SEAT FORCE / WT	10.41	0.63	3935.00	3613.00	
LF FOOT X	22.53	-53.42	3879.00	3929.00	20
RT FOOT X	33.43	-72.31	3878.00	3930.00	23
CT FOOT X	10.04	-192.10	3881.00	3930.00	26
TOTAL FOOT X	48.33	-317.83	3880.00	3930.00	
LF FOOT Y	110.18	-12.98	3914.00	4000.00	21
RT FOOT Y	15.14	-144.60	4105.00	3913.00	24
CT FOOT Y	42.26	-15.59	3878.00	4075.00	27
TOTAL FOOT Y	57.44	-48.02	3881.00	3929.00	
LF FOOT Z	186.77	-3.86	3915.00	3910.00	22
RT FOOT Z	174.92	0.09	3922.00	4026.00	25
CT FOOT Z	204.02	-70.15	3921.00	3890.00	28
TOTAL FOOT Z	531.05	-37.26	3922.00	3890.00	
RES FOOT FORCE	569.08	57.93	3915.00	4017.00	

NEG SHLD HAR ANG TEST: 50[illegible] SUBJ: [illegible] W: [illegible] GP: 2 CELL: [illegible]

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	314.00	74.00	48
CARRIAGE X	1.52	-1.06	3874.00	3881.00	35
CARRIAGE Y	0.93	-0.58	3865.00	3890.00	31
CARRIAGE Z	12.08	-0.22	3905.00	3738.00	[illegible]
CARRIAGE Z (SM)	10.31	-0.07	3906.00	3738.00	
CARRIAGE VEL	-1.26	25.13	4183.00	3867.00	29
SEAT X	1.42	-1.17	3877.00	3918.00	32
SEAT Y	1.90	-2.20	3872.00	3878.00	33
SEAT Z	11.22	-0.15	3911.00	3748.00	34
SEAT Z (SM)	10.41	-0.07	3912.00	3747.00	
CHEST X	2.61	-1.53	3932.00	3969.00	5
CHEST Y	0.08	-2.11	3969.00	3936.00	6
CHEST Z	15.01	-0.72	3922.00	3734.00	7
CHEST RES	15.35	[illegible]	3923.00	3730.00	
CHEST SI	30.28		3869.00	4105.00	
HEAD X	0.71	[illegible]	3921.00	3960.00	2
HEAD Y	2.99	[illegible]	3998.00	3935.00	3
HEAD Z	11.28	-1.64	3931.00	3770.00	4
HEAD RES	11.30	2.06	3931.00	4171.00	
HEAD SI	15.47		3891.00	4011.00	
HEAD HIC	11.76		3905.00	3966.00	
SHD REFL LF	27.81	[illegible]	3952.00	4032.00	14
SHD REEL LF	32.11	2.82	3973.00	3909.00	16
LF SHOULDER	52.60	16.17	3972.00	3910.00	
SHD REFL RT	39.86	22.50	4010.00	3908.00	15
SHD REEL RT	41.67	2.33	3996.00	3914.00	17
RT SHOULDER	77.36	25.75	3997.00	3914.00	
TOTAL SHLD REFL	58.73	35.87	3944.00	3907.00	
TOTAL SHLD REEL	64.24	6.18	3978.00	3911.00	
TOTAL SHOULDER	110.44	42.41	3979.00	3912.00	
TOTAL SHD / WT	0.74	0.28	3979.00	3912.00	
LF LAP BELT	41.53	16.18	3991.00	3938.00	8
RT LAP BELT	68.26	23.32	3989.00	3914.00	9
TOTAL LAP	109.03	43.31	3990.00	3919.00	
TOTAL LAP / WT	0.73	0.29	3990.00	3919.00	
CROTCH STRAP	134.85	-2.41	4001.00	3926.00	10
LF SEAT LNK X	45.30	-219.15	3722.00	3928.00	18
RT SEAT LNK X	25.70	-81.90	3841.00	3934.00	19
TOTAL SEAT X	62.36	-298.67	3841.00	3932.00	
SEAT LNK Y	31.98	-149.11	4184.00	3938.00	35
LF SEAT PAN Z	641.41	50.03	3928.00	3622.00	11
RT SEAT PAN Z	549.94	45.79	3929.00	3610.00	12
CT SEAT PAN Z	485.26	24.41	3937.00	3603.00	13
TOTAL SEAT Z	1652.22	138.84	3930.00	3603.00	
TOTAL SEAT Z / WT	11.09	0.93	3930.00	3603.00	
RES SEAT FORCE	1684.12	149.74	3930.00	3603.00	
RES SEAT FORCE / WT	11.30	1.00	3930.00	3603.00	
LF FOOT X	25.46	-94.79	3875.00	3922.00	20
RT FOOT X	53.40	-25.03	3910.00	3931.00	23
CT FOOT X	11.45	-148.65	3875.00	3923.00	26
TOTAL FOOT X	55.94	-247.28	3875.00	3922.00	
LF FOOT Y	126.67	-6.10	3907.00	3877.00	21
RT FOOT Y	30.35	-92.12	3964.00	3924.00	24
CT FOOT Y	9.63	-74.92	4091.00	3925.00	27
TOTAL FOOT Y	55.06	-70.90	3947.00	3924.00	
LF FOOT Z	177.71	-38.77	3895.00	3866.00	22
RT FOOT Z	176.12	-1.63	3907.00	3815.00	25
CT FOOT Z	137.71	-80.29	3927.00	3885.00	28
TOTAL FOOT Z	366.87	-73.10	3917.00	3865.00	
RES FOOT FORCE	423.42	37.70	3917.00	4147.00	

[illegible] TEST: 504 SUBJ: G-3 WT: [illegible] 10 [illegible]: 1 [illegible]

DATA ID	MAX	MIN	T1	T2	[illegible]
10V EXT PWR	10.05	9.96	2594.00	2540.00	48
CARRIAGE X	1.16	-1.00	3858.00	3850.00	36
CARRIAGE Y	0.73	-0.55	3858.00	3831.00	31
CARRIAGE Z	12.54	-0.36	3851.00	3777.00	1
CARRIAGE Z (SM)	10.52	-0.08	3851.00	3776.00	
CARRIAGE VEL	-0.89	-25.88	4176.00	3793.00	29
SEAT X	1.17	-1.01	3819.00	3826.00	32
SEAT Y	1.10	-1.32	3914.00	3821.00	33
SEAT Z	11.42	-0.24	3857.00	3667.00	34
SEAT Z (SM)	10.62	-0.12	3858.00	3667.00	
CHEST X	4.51	-2.34	3873.00	3909.00	5
CHEST Y	-0.11	-3.01	3625.00	3876.00	6
CHEST Z	21.09	-0.82	3889.00	3772.00	7
CHEST RES	21.13	0.57	3889.00	3675.00	
CHEST SI	38.53		3813.00	4137.00	
HEAD X	2.52	-5.03	3867.00	3917.00	2
HEAD Y	2.22	0.22	3971.00	3900.00	3
HEAD Z	12.98	-1.42	3867.00	3696.00	4
HEAD RES	13.34	1.36	3867.00	4054.00	
HEAD SI	19.96		3825.00	3941.00	
HEAD HIC	15.89		3847.00	3922.00	
SHD REFL LF	64.24	12.66	3897.00	4094.00	14
SHD REEL LF	67.40	5.38	3896.00	3854.00	16
LF SHOULDER	131.40	24.94	3896.00	3995.00	
SHD REFL RT	43.53	11.83	3904.00	3991.00	15
SHD REEL RT	69.23	-1.35	3906.00	4008.00	17
RT SHOULDER	112.55	11.86	3906.00	4008.00	
TOTAL SHLD REFL	105.09	27.59	3896.00	3993.00	
TOTAL SHLD REEL	120.84	6.76	3905.00	3854.00	
TOTAL SHOULDER	221.62	39.40	3904.00	4001.00	
TOTAL SHD / WT	1.35	0.24	3904.00	4001.00	
LF LAP BELT	25.61	4.05	3928.00	3856.00	8
RT LAP BELT	45.35	10.51	3926.00	3853.00	9
TOTAL LAP	70.28	15.30	3927.00	3855.00	
TOTAL LAP / WT	0.43	0.09	3927.00	3855.00	
CROTCH STRAP	206.71	6.31	3926.00	3874.00	10
LF SEAT LNK X	20.25	-220.58	3796.00	3868.00	18
RT SEAT LNK X	13.81	-117.16	3919.00	3873.00	19
TOTAL SEAT X	18.15	-334.74	3689.00	3867.00	
SEAT LNK Y	29.99	-123.14	3801.00	3872.00	35
LF SEAT PAN Z	525.77	38.94	3875.00	3609.00	11
RT SEAT PAN Z	584.39	29.94	3876.00	3669.00	12
CT SEAT PAN Z	689.31	34.35	3875.00	3630.00	13
TOTAL SEAT Z	1798.87	118.05	3875.00	3607.00	
TOTAL SEAT Z / WT	10.97	0.72	3875.00	3607.00	
RES SEAT FORCE	1831.66	120.13	3875.00	3607.00	
RES SEAT FORCE / WT	11.17	0.73	3875.00	3607.00	
LF FOOT X	17.52	-114.48	3817.00	3868.00	20
RT FOOT X	43.14	-69.65	3857.00	3888.00	23
CT FOOT X	15.24	-171.69	3818.00	3866.00	26
TOTAL FOOT X	42.33	-302.70	3817.00	3888.00	
LF FOOT Y	121.64	-8.51	3853.00	3819.00	21
RT FOOT Y	16.40	-111.39	3900.00	3862.00	24
CT FOOT Y	25.42	-59.13	3983.00	3870.00	27
TOTAL FOOT Y	51.12	-57.24	3835.00	3870.00	
LF FOOT Z	167.96	-8.79	3862.00	3809.00	22
RT FOOT Z	155.07	-27.81	3862.00	3966.00	25
CT FOOT Z	210.69	-67.16	3858.00	3830.00	28
TOTAL FOOT Z	470.79	-71.46	3862.00	3807.00	
RES FOOT FORCE	535.02	42.50	3862.00	3950.00	

NEG SHLD HAR ANG TEST: 497 SUBJ: G-2 WT: 119.0 G: 10 GP: 1 CELL: H

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.98	2576.00	892.00	48
CARRIAGE X	1.33	-1.48	3862.00	3867.00	36
CARRIAGE Y	0.86	-0.77	3838.00	3979.00	31
CARRIAGE Z	12.97	-0.29	3867.00	3766.00	1
CARRIAGE Z (SM)	10.52	-0.04	3868.00	3766.00	
CARRIAGE VEL	-1.17	-26.19	4184.00	3831.00	29
SEAT X	1.39	-1.20	3862.00	3866.00	32
SEAT Y	1.16	-1.19	3835.00	3842.00	33
SEAT Z	12.05	-0.17	3873.00	3614.00	34
SEAT Z (SM)	10.63	-0.13	3874.00	3685.00	
CHEST X	3.64	-2.19	3892.00	3928.00	5
CHEST Y	-0.02	-1.96	3881.00	3940.00	6
CHEST Z	18.04	-1.08	3904.00	3690.00	7
CHEST RES	18.11	0.82	3904.00	3828.00	
CHEST SI	30.96		3835.00	3954.00	
HEAD X	0.60	-4.62	3832.00	3931.00	2
HEAD Y	2.87	1.83	3872.00	3771.00	3
HEAD Z	12.70	-1.63	3895.00	3624.00	4
HEAD RES	12.90	1.89	3895.00	3837.00	
HEAD SI	18.65		3843.00	3958.00	
HEAD HIC	14.95		3866.00	3937.00	
SHD REFL LF	33.68	11.83	3912.00	3990.00	14
SHD REEL LF	35.63	4.07	3932.00	3881.00	16
LF SHOULDER	61.91	19.45	3931.00	4034.00	
SHD REFL RT	29.35	11.26	3925.00	4011.00	15
SHD REEL RT	37.33	5.97	3935.00	4020.00	17
RT SHOULDER	65.92	17.82	3935.00	4020.00	
TOTAL SHLD REFL	61.61	24.47	3916.00	4011.00	
TOTAL SHLD REEL	72.28	12.36	3933.00	3881.00	
TOTAL SHOULDER	125.76	37.84	3934.00	4020.00	
TOTAL SHD / WT	1.06	0.32	3934.00	4020.00	
LF LAP BELT	32.86	11.37	3971.00	3876.00	8
RT LAP BELT	40.14	13.18	3950.00	3875.00	9
TOTAL LAP	71.58	24.76	3950.00	3875.00	
TOTAL LAP / WT	0.60	0.21	3950.00	3875.00	
CROTCH STRAP	98.62	-1.69	3960.00	3893.00	10
LF SEAT LNK X	55.68	-134.45	3793.00	3895.00	18
RT SEAT LNK X	41.57	-48.82	3830.00	3897.00	19
TOTAL SEAT X	91.33	-182.69	3809.00	3897.00	
SEAT LNK Y	45.34	-76.80	3802.00	3889.00	35
LF SEAT PAN Z	477.72	40.73	3884.00	4143.00	11
RT SEAT PAN Z	479.77	37.49	3890.00	4196.00	12
CT SEAT PAN Z	362.91	11.87	3893.00	3639.00	13
TOTAL SEAT Z	1295.64	153.14	3891.00	3642.00	
TOTAL SEAT Z / WT	10.89	1.29	3891.00	3642.00	
RES SEAT FORCE	1308.52	164.00	3892.00	4197.00	
RES SEAT FORCE / WT	11.00	1.38	3892.00	4197.00	
LF FOOT X	34.34	-36.18	3837.00	3869.00	20
RT FOOT X	23.53	-50.49	3874.00	3868.00	23
CT FOOT X	9.70	-151.30	3838.00	3868.00	26
TOTAL FOOT X	49.03	-237.09	3837.00	3869.00	
LF FOOT Y	89.93	-17.50	3877.00	3946.00	21
RT FOOT Y	29.50	-109.62	4176.00	3868.00	24
CT FOOT Y	39.85	-25.11	3997.00	3880.00	27
TOTAL FOOT Y	68.30	-88.30	3836.00	3844.00	
LF FOOT Z	170.04	-46.88	3860.00	3830.00	22
RT FOOT Z	128.91	-24.42	3834.00	3981.00	25
CT FOOT Z	139.68	-99.51	3875.00	3829.00	28
TOTAL FOOT Z	335.93	-111.81	3860.00	3829.00	
RES FOOT FORCE	349.97	13.66	3860.00	4148.00	

[illegible] HAR ANG TEST: 509 SUBJ: H-3 WT: [illegible]86.0 G: [illegible]0 OP: 2 CELL: H

[illegible]	MAX	MIN	T1	T2	CH
[illegible]	10.05	9.96	20.00	1223.00	48
[illegible]	1.23	-1.48	3920.00	3925.00	36
CARRIAGE [illegible]	1.00	-0.68	3920.00	4040.00	31
CARRIAGE Z	11.76	-0.25	3913.00	3629.00	1
CARRIAGE Z (SM)	10.30	-0.12	3926.00	3630.00	
CARRIAGE [illegible]	-1.10	-25.90	4172.00	3866.00	29
[illegible] X	1.61	-2.08	3920.00	3925.00	32
[illegible]	1.06	-1.43	3877.00	3884.00	33
[illegible]	10.91	-0.14	3917.00	3746.00	34
SEA[illegible] (SM)	10.28	-0.07	3919.00	3745.00	
CHEST [illegible]	4.20	-2.44	3929.00	3983.00	5
CHEST	-0.08	-2.60	3996.00	3963.00	6
CHEST [illegible]	19.09	-0.64	3938.00	3748.00	7
[illegible]	19.33	0.54	3938.00	3639.00	
[illegible]	40.06		3877.00	4013.00	
[illegible]	3.63	-3.94	3930.00	3984.00	2
[illegible]	1.66	0.89	4046.00	3946.00	3
HE[illegible] Z	11.59	-1.25	3942.00	3819.00	4
HE[illegible] RES	11.95	1.26	3942.00	3882.00	
[illegible]AD SI	20.62		3889.00	4002.00	
[illegible]AD HI[illegible]	17.75		3910.00	3974.00	
SH[illegible] [illegible]FL [illegible]F	39.70	10.91	3980.00	4042.00	14
SHL [illegible]EL [illegible]F	49.04	2.27	3967.00	3927.00	16
[illegible] SHOULDER	82.30	15.00	3970.00	4050.00	
SHD REFL RT	49.41	13.32	3984.00	4049.00	15
SHD REEL RT	72.10	0.92	3974.00	4055.00	17
RT SHOULDER	119.14	14.97	3974.00	4054.00	
TOTAL SHLD REFL	85.48	24.65	3980.00	4050.00	
TOTAL SHLD REEL	116.98	4.76	3973.00	3914.00	
TOTAL SHOULDER	197.09	31.52	3973.00	4051.00	
TOTAL SHD / WT	1.06	0.17	3973.00	4051.00	
LF LAP BELT	32.61	12.70	4086.00	3920.00	8
RT LAP BELT	33.62	13.46	3999.00	3919.00	9
TOTAL LAP	64.30	26.34	3999.00	3920.00	
TOTAL LAP / WT	0.35	0.14	3999.00	3920.00	
CROTCH STRAP	196.24	-16.28	3988.00	3939.00	10
LF SEAT LNK X	46.98	-208.25	4174.00	3935.00	18
RT SEAT LNK X	47.38	-72.54	3882.00	3935.00	19
TOTAL SEAT X	42.72	-280.79	4163.00	3935.00	
SEAT LNK Y	49.57	-73.78	4004.00	3936.00	35
LF SEAT PAN Z	513.95	16.97	3937.00	3658.00	11
RT SEAT PAN Z	515.77	15.96	3935.00	3612.00	12
CT SEAT PAN Z	878.69	38.74	3938.00	3607.00	13
TOTAL SEAT Z	1894.36	87.97	3937.00	3601.00	
TOTAL SEAT Z / WT	10.18	0.47	3937.00	3601.00	
RES SEAT FORCE	1915.36	90.02	3937.00	3601.00	
RES SEAT FORCE / WT	10.30	0.48	3937.00	3601.00	
LF FOOT X	-6.67	-159.47	3880.00	3930.00	20
RT FOOT X	14.61	-95.54	3881.00	3940.00	23
CT FOOT X	-49.82	-269.85	3881.00	3932.00	26
TOTAL FOOT X	-45.45	-518.61	3880.00	3931.00	
LF FOOT Y	142.39	-2.60	3931.00	4005.00	21
RT FOOT Y	34.40	-112.92	3968.00	3915.00	24
CT FOOT Y	9.90	-79.99	3881.00	3937.00	27
TOTAL FOOT Y	56.56	-68.73	3898.00	3944.00	
LF FOOT Z	199.24	-14.97	3951.00	3871.00	22
RT FOOT Z	255.29	24.34	3940.00	4124.00	25
CT FOOT Z	280.88	-104.99	3934.00	3872.00	28
TOTAL FOOT Z	615.47	-84.96	3933.00	3871.00	
RES FOOT FORCE	759.12	116.15	3932.00	3788.00	

NEG SHLD HAR ANG TEST: 521 SUBJ: H-4 WT: 187.0 G: 10 OP: 2 CE. [illegible]

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	1540.00	1994.00	48
CARRIAGE X	1.06	-0.72	3833.00	3827.00	36
CARRIAGE Y	0.93	-0.45	3832.00	3939.0[illegible]	[illegible]
CARRIAGE Z	10.92	-0.25	3828.[illegible]	[illegible]	
CARRIAGE Z (SM)	10.32	-0.11	3828.00	[illegible]	
CARRIAGE VEL	-1.05	-26.13	4177.00	378[illegible].00	
SEAT X	2.42	-1.10	3788.00	[illegible]	[illegible]
SEAT Y	0.76	-0.85	3921.00	[illegible]	[illegible]
SEAT Z	12.32	-0.28	3834.00	[illegible]	[illegible]
SEAT Z (SM)	11.10	-0.17	3834.00	[illegible]	[illegible]
CHEST X	1.47	-2.78	3939.00	[illegible]	
CHEST Y	0.23	-2.98	3914.00	[illegible]	[illegible]
CHEST Z	17.19	-1.01	3850.00	[illegible]	
CHEST RES	17.40	0.61	3850.00	3649.00	
CHEST SI	34.58		3789.00	[illegible]	
HEAD X	4.88	-2.55	3852.00	[illegible]	
HEAD Y	2.86	-0.41	3925.00	[illegible]	
HEAD Z	13.66	-2.12	3851.00	[illegible]	[illegible]
HEAD RES	14.48	1.32	3851.[illegible]	[illegible]	
HEAD SI	23.96		3805.[illegible]	[illegible]	
HEAD HIC	18.57		3828.[illegible]	[illegible]	
SHD REFL LF	38.02	6.29	3879.[illegible]	[illegible]	
SHD REEL LF	37.69	-1.11	3891.[illegible]	[illegible]	[illegible]
LF SHOULDER	70.63	14.30	3890.[illegible]	[illegible]	[illegible]
SHD REFL RT	32.48	13.34	3890.[illegible]	[illegible]	
SHD REEL RT	51.08	-1.50	3888.[illegible]	[illegible]	[illegible]
RT SHOULDER	83.16	14.53	3889.[illegible]	[illegible]	[illegible]
TOTAL SHLD REFL	67.10	24.01	3891.[illegible]	[illegible]	
TOTAL SHLD REEL	87.32	0.30	3890.[illegible]	[illegible]	
TOTAL SHOULDER	153.48	35.91	3889.00	[illegible]	
TOTAL SHD / WT	0.82	0.19	3889.00	[illegible]	
LF LAP BELT	49.73	25.28	3878.00	3828	
RT LAP BELT	71.96	39.04	3897.00	[illegible]	[illegible]
TOTAL LAP	120.30	65.73	3897.00	3828	[illegible]
TOTAL LAP / WT	0.64	0.35	3897.00	3828.00	
CROTCH STRAP	137.84	-64.94	4050.00	3845.00	
LF SEAT LNK X	27.09	-216.04	3784.00	3846.00	[illegible]
RT SEAT LNK X	16.86	-107.96	3787.00	38[illegible]4.00	[illegible]
TOTAL SEAT X	35.00	-322.19	3615.00	3845.00	[illegible]
SEAT LNK Y	36.48	-136.70	3705.00	[illegible].00	
LF SEAT PAN Z	627.19	59.01	3845.00	[illegible]	[illegible]
RT SEAT PAN Z	757.35	76.69	3846.00	[illegible]	
CT SEAT PAN Z	642.20	60.26	3845.00	[illegible]	[illegible]
TOTAL SEAT Z	2023.30	223.33	3845.00		[illegible]
TOTAL SEAT Z / WT	10.82	1.19	3845.[illegible]		
RES SEAT FORCE	2052.99	227.11	3845.[illegible]		
RES SEAT FORCE / WT	10.98	1.21	3845.[illegible]		
LF FOOT X	-23.16	-139.80	4055.[illegible]		
RT FOOT X	13.38	-94.13	3724.00	[illegible]	[illegible]
CT FOOT X	-68.64	-238.58	4072.00	[illegible]	26
TOTAL FOOT X	-96.13	-468.03	4055.00	385[illegible]	
LF FOOT Y	138.93	-5.19	3830.00	4054.00	21
RT FOOT Y	15.07	-141.12	4025.00	38[illegible].00	24
CT FOOT Y	16.36	-41.49	3939.00	3833.00	27
TOTAL FOOT Y	36.45	-46.85	3808.00	3897.00	
LF FOOT Z	243.69	27.56	3832.00	3917.00	22
RT FOOT Z	202.29	17.95	3837.00	4097.00	25
CT FOOT Z	128.62	-66.75	3837.00	3780.00	28
TOTAL FOOT Z	539.27	34.13	3837.00	4097.00	
RES FOOT FORCE	656.41	113.57	3837.00	4063.00	

NEG SHLD HAR ANG TEST: 502 SUBJ: K-1 WT: 180.0 G: 10 GP: 1 CELL: H

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	15.00	2957.00	48
CARRIAGE X	1.18	-0.92	3912.00	3918.00	36
CARRIAGE Y	0.88	-0.50	3922.00	3861.00	31
CARRIAGE Z	12.01	-0.22	3905.00	3821.00	1
CARRIAGE Z (SM)	10.34	-0.09	3905.00	3834.00	
CARRIAGE VEL	-1.13	-26.24	4146.00	3865.00	29
SEAT X	1.26	-1.31	3913.00	3918.00	32
SEAT Y	1.72	-1.71	3874.00	3880.00	33
SEAT Z	10.95	-0.32	3910.00	3741.00	34
SEAT Z (SM)	10.31	-0.13	3912.00	3741.00	
CHEST X	7.06	-0.64	3927.00	3971.00	5
CHEST Y	-0.33	-2.39	3916.00	3936.00	6
CHEST Z	16.46	-0.68	3936.00	3832.00	7
CHEST RES	17.26	0.95	3935.00	3786.00	
CHEST SI	34.91		3871.00	3995.00	
HEAD X	1.34	-4.93	3928.00	3962.00	2
HEAD Y	1.98	-0.55	3973.00	3942.00	3
HEAD Z	13.45	-1.35	3926.00	3667.00	4
HEAD RES	13.50	1.22	3926.00	4199.00	
HEAD SI	19.79		3883.00	4003.00	
HEAD HIC	16.24		3904.00	3967.00	
SHD REFL LF	34.53	12.86	3952.00	4037.00	14
SHD REEL LF	34.48	2.93	3961.00	3915.00	16
LF SHOULDER	63.36	22.44	3962.00	4047.00	
SHD REFL RT	46.91	22.51	3937.00	4009.00	15
SHD REEL RT	50.00	-1.12	3951.00	3909.00	17
RT SHOULDER	91.03	27.60	3951.00	3907.00	
TOTAL SHLD REFL	80.19	38.24	3936.00	4016.00	
TOTAL SHLD REEL	75.83	3.83	3956.00	3909.00	
TOTAL SHOULDER	149.82	57.20	3953.00	3908.00	
TOTAL SHD / WT	0.83	0.32	3953.00	3908.00	
LF LAP BELT	34.70	16.19	3994.00	4081.00	8
RT LAP BELT	52.33	18.04	3991.00	4082.00	9
TOTAL LAP	86.52	34.27	3992.00	4081.00	
TOTAL LAP / WT	0.48	0.19	3992.00	4081.00	
CROTCH STRAP	225.65	-6.18	4004.00	3926.00	10
LF SEAT LNK X	18.80	-238.15	3772.00	3926.00	18
RT SEAT LNK X	-1.06	-152.32	3724.00	3927.00	19
TOTAL SEAT X	11.41	-389.24	3724.00	3926.00	
SEAT LNK Y	41.64	-133.98	4158.00	3929.00	35
LF SEAT PAN Z	723.69	56.40	3929.00	3627.00	11
RT SEAT PAN Z	821.21	39.84	3928.00	3673.00	12
CT SEAT PAN Z	627.90	20.07	3931.00	3609.00	13
TOTAL SEAT Z	2155.03	128.65	3929.00	3609.00	
TOTAL SEAT Z / WT	11.97	0.71	3929.00	3609.00	
RES SEAT FORCE	2191.97	129.54	3929.00	3609.00	
RES SEAT FORCE / WT	12.18	0.72	3929.00	3609.00	
LF FOOT X	25.82	-74.54	3873.00	3923.00	20
RT FOOT X	28.34	-25.41	3912.00	3924.00	23
CT FOOT X	11.84	-159.89	3873.00	3923.00	26
TOTAL FOOT X	57.19	-257.19	3873.00	3923.00	
LF FOOT Y	108.68	-10.11	3907.00	3977.00	21
RT FOOT Y	19.52	-87.86	4025.00	3907.00	24
CT FOOT Y	14.44	-55.87	4109.00	3922.00	27
TOTAL FOOT Y	46.74	-58.20	3894.00	3937.00	
LF FOOT Z	139.86	-9.02	3932.00	3961.00	22
RT FOOT Z	175.22	-22.17	3908.00	3961.00	25
CT FOOT Z	166.22	-37.98	3912.00	4010.00	28
TOTAL FOOT Z	422.67	-20.64	3908.00	3961.00	
RES FOOT FORCE	463.16	40.61	3908.00	3846.00	

NEG SHLD HAR ANG TEST: 512 SUBJ: M-2 WT: 167.0 G: 10 GP: 1 CELL: H

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	121.00	246.00	48
CARRIAGE X	1.26	-0.93	3850.00	3832.00	36
CARRIAGE Y	0.85	-0.62	3866.00	3840.00	3[illegible]
CARRIAGE Z	10.85	-0.16	3876.00	3732.00	[illegible]
CARRIAGE Z (SM)	10.49	-0.06	3862.00	3732.00	
CARRIAGE VEL	-1.04	-25.82	4163.00	3804.00	29
SEAT X	1.38	-1.14	3828.00	3835.00	32
SEAT Y	1.70	-2.08	3823.00	3830.00	33
SEAT Z	11.72	-0.17	3870.00	3723.00	34
SEAT Z (SM)	11.08	-0.09	3870.00	3689.00	
CHEST X	1.71	-3.22	3870.00	3913.00	5
CHEST Y	0.61	-1.43	3877.00	3900.00	6
CHEST Z	20.55	-0.60	3892.00	3744.00	7
CHEST RES	20.56	0.36	3892.00	3811.00	
CHEST SI	39.00		3823.00	3932.00	
HEAD X	1.12	-5.57	3866.00	3915.00	2
HEAD Y	1.46	-0.97	3960.00	3885.00	3
HEAD Z	11.80	-1.31	3881.00	3657.00	4
HEAD RES	11.85	1.02	3881.00	3827.00	
HEAD SI	16.42		3833.00	3967.00	
HEAD HIC	13.04		3853.00	3938.00	
SHD REFL LF	44.94	12.86	3905.00	4100.00	14
SHD REEL LF	58.91	1.67	3910.00	3864.00	16
LF SHOULDER	102.08	19.93	3910.00	3863.00	
SHD REFL RT	34.45	11.95	3898.00	3991.00	15
SHD REEL RT	51.05	4.60	3910.00	3862.00	17
RT SHOULDER	82.38	19.60	3910.00	3989.00	
TOTAL SHLD REFL	78.79	28.34	3899.00	4001.00	
TOTAL SHLD REEL	109.96	6.67	3910.00	3864.00	
TOTAL SHOULDER	184.46	42.08	3910.00	3862.00	
TOTAL SHD / WT	1.10	0.25	3910.00	3862.00	
LF LAP BELT	49.52	18.88	3921.00	3862.00	8
RT LAP BELT	65.59	28.89	3920.00	3862.00	9
TOTAL LAP	114.84	47.78	3921.00	3862.00	
TOTAL LAP / WT	0.69	0.29	3921.00	3862.00	
CROTCH STRAP	60.71	-37.16	3962.00	3883.00	10
LF SEAT LNK X	29.42	-186.05	3749.00	3879.00	18
RT SEAT LNK X	18.00	-96.36	3795.00	3883.00	19
TOTAL SEAT X	40.51	-282.42	3795.00	3883.00	
SEAT LNK Y	42.57	-114.81	4184.00	3878.00	35
LF SEAT PAN Z	561.82	49.05	3880.00	3609.00	11
RT SEAT PAN Z	567.87	46.58	3878.00	3607.00	12
CT SEAT PAN Z	825.53	41.08	3881.00	3605.00	13
TOTAL SEAT Z	1928.02	148.78	3878.00	3601.00	
TOTAL SEAT Z / WT	11.55	0.89	3878.00	3601.00	
RES SEAT FORCE	1951.28	151.47	3878.00	3601.00	
RES SEAT FORCE / WT	11.68	0.91	3878.00	3601.00	
LF FOOT X	17.94	-65.24	3825.00	3881.00	20
RT FOOT X	12.90	-69.05	3705.00	3882.00	23
CT FOOT X	-9.59	-189.37	3826.00	3882.00	26
TOTAL FOOT X	12.36	-319.14	3825.00	3882.00	
LF FOOT Y	93.16	-10.78	3865.00	3946.00	21
RT FOOT Y	25.26	-125.61	3912.00	3866.00	24
CT FOOT Y	29.48	-48.84	3845.00	3869.00	27
TOTAL FOOT Y	57.05	-67.82	3845.00	3866.00	
LF FOOT Z	150.24	-8.03	3869.00	3817.00	22
RT FOOT Z	184.46	6.41	3866.00	3940.00	25
CT FOOT Z	198.68	-65.11	3872.00	3837.00	28
TOTAL FOOT Z	505.76	-48.43	3872.00	3816.00	
RES FOOT FORCE	541.67	66.78	3872.00	4122.00	

NEG SHLD HAR ANG TEST: 511 SUBJ: M10 WT: 144.0 G: 10 GP: 1 CELL: H

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	379.00	1635.00	48
CARRIAGE X	1.16	-1.05	3924.00	3934.00	36
CARRIAGE Y	0.73	-0.80	3917.00	3859.00	31
CARRIAGE Z	10.71	-0.22	3914.00	3606.00	1
CARRIAGE Z (SM)	10.39	-0.07	3915.00	3768.00	
CARRIAGE VEL	-1.19	-26.15	4146.00	3862.00	29
SEAT X	1.11	-1.17	3923.00	3935.00	32
SEAT Y	0.94	-1.30	3873.00	3881.00	33
SEAT Z	11.82	-0.21	3920.00	3729.00	34
SEAT Z (SM)	11.19	0.10	3921.00	3730.00	
CHEST X	3.63	-2.06	3932.00	3965.00	5
CHEST Y	0.19	2.19	3915.00	3932.00	6
CHEST Z	20.24	-0.98	3940.00	3864.00	7
CHEST RES	20.38	1.00	3940.00	3867.00	
CHEST SI	35.77		3873.00	4116.00	
HEAD X	1.25	-3.55	3924.00	3966.00	2
HEAD Y	1.47	0.38	4166.00	3935.00	3
HEAD Z	14.19	-1.27	3929.00	4122.00	4
HEAD RES	14.23	0.78	3929.00	3877.00	
HEAD SI	22.05		3883.00	4087.00	
HEAD HIC	16.81		3904.00	3965.00	
SHD REFL LF	34.94	8.26	3945.00	4054.00	14
SHD REEL LF	36.40	1.64	3962.00	3915.00	16
LF SHOULDER	62.40	11.80	3962.00	4055.00	
SHD REFL RT	26.43	14.01	3951.00	4056.00	15
SHD REEL RT	27.79	0.45	3976.00	3916.00	17
RT SHOULDER	47.54	15.55	3977.00	4069.00	
TOTAL SHLD REFL	60.13	22.38	3951.00	4055.00	
TOTAL SHLD REEL	57.09	2.18	3971.00	3915.00	
TOTAL SHOULDER	102.11	29.05	3971.00	4056.00	
TOTAL SHD / WT	0.71	0.20	3971.00	4056.00	
LF LAP BELT	46.26	21.96	3982.00	3921.00	8
RT LAP BELT	36.51	17.07	3968.00	3925.00	9
TOTAL LAP	82.59	41.29	3982.00	3923.00	
TOTAL LAP / WT	0.57	0.29	3982.00	3923.00	
CROTCH STRAP	87.78	0.59	4013.00	3934.00	10
LF SEAT LNK X	25.70	-218.01	3840.00	3931.00	18
RT SEAT LNK X	13.02	-77.98	3766.00	3929.00	19
TOTAL SEAT X	32.96	-294.83	3766.00	3929.00	
SEAT LNK Y	23.04	-126.44	4159.00	3930.00	35
LF SEAT PAN Z	556.25	29.06	3928.00	3663.00	11
RT SEAT PAN Z	452.27	15.88	3929.00	3744.00	12
CT SEAT PAN Z	702.51	25.98	3930.00	3645.00	13
TOTAL SEAT Z	1698.17	86.43	3929.00	3636.00	
TOTAL SEAT Z / WT	11.79	0.60	3929.00	3636.00	
RES SEAT FORCE	1727.98	90.08	3929.00	3636.00	
RES SEAT FORCE / WT	12.00	0.63	3929.00	3636.00	
LF FOOT X	23.56	-54.19	3875.00	3933.00	20
RT FOOT X	19.86	-51.51	3874.00	3933.00	23
CT FOOT X	26.12	-160.82	3875.00	3934.00	26
TOTAL FOOT X	65.13	-257.58	3875.00	3933.00	
LF FOOT Y	83.47	-14.36	3919.00	3985.00	21
RT FOOT Y	16.26	-112.42	3961.00	3919.00	24
CT FOOT Y	37.18	-19.77	3895.00	4046.00	27
TOTAL FOOT Y	54.38	-41.91	3895.00	3983.00	
LF FOOT Z	131.90	-20.03	3923.00	3866.00	22
RT FOOT Z	145.78	-20.24	3921.00	4027.00	25
CT FOOT Z	153.10	-66.42	3924.00	3866.00	28
TOTAL FOOT Z	421.67	-74.01	3921.00	3866.00	
RES FOOT FORCE	456.69	36.60	3921.00	3688.00	

NEG SHLD HAR ANG TEST: 506 SUBJ: M11 WT: 157.0 G: 10 GP: 1 CELL: H

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	243.00	1013.00	48
CARRIAGE X	1.20	-1.26	3909.00	3915.00	36
CARRIAGE Y	0.79	-0.69	3925.00	3868.00	31
CARRIAGE Z	12.81	-0.21	3915.00	3605.00	1
CARRIAGE Z (SM)	10.50	-0.07	3915.00	3603.00	
CARRIAGF VEL	-1.27	-26.13	4200.00	3874.00	29
SEAT X	1.77	-1.49	3864.00	3894.00	32
SEAT Y	0.57	-0.85	3963.00	3877.00	33
SEAT Z	11.09	-0.18	3913.00	3626.00	34
SEAT Z (SM)	10.33	-0.10	3923.00	3745.00	
CHEST X	4.22	-2.01	3937.00	3977.00	5
CHEST Y	0.37	-1.68	3935.00	3920.00	6
CHEST Z	18.27	-0.58	3946.00	3711.00	7
CHEST RES	18.36	0.57	3946.00	4022.00	
CHEST SI	31.60		3881.00	3991.00	
HEAD X	1.48	-4.45	3926.00	3967.00	2
HEAD Y	1.22	-0.34	4161.00	3961.00	3
HEAD Z	13.15	-2.28	3939.00	4117.00	4
HEAD RES	13.17	0.73	3939.00	3887.00	
HEAD SI	21.51		3889.00	4094.00	
HEAD HIC	17.11		3912.00	3974.00	
SHD REFL LF	47.49	23.91	3950.00	4030.00	14
SHD REEL LF	48.05	7.09	3963.00	3921.00	16
LF SHOULDER	93.57	36.10	3962.00	3917.00	
SHD REFL RT	29.12	16.50	3959.00	4015.00	15
SHD REEL RT	33.19	-0.25	3974.00	3921.00	17
RT SHOULDER	57.21	17.11	3974.00	3920.00	
TOTAL SHLD REFL	75.42	41.06	3960.00	4030.00	
TOTAL SHLD REEL	65.72	6.83	3973.00	3921.00	
TOTAL SHOULDER	132.17	53.81	3965.00	3919.00	
TOTAL SHD / WT	0.84	0.34	3965.00	3919.00	
LF LAP BELT	35.42	12.53	4028.00	3915.00	8
RT LAP BELT	37.04	10.25	4020.00	3915.00	9
TOTAL LAP	72.19	22.78	4020.00	3915.00	
TOTAL LAP / WT	0.46	0.15	4020.00	3915.00	
CROTCH STRAP	194.28	4.83	4022.00	3934.00	10
LF SEAT LNK X	17.28	-218.35	3829.00	3936.00	18
RT SEAT LNK X	7.77	-129.96	3636.00	3940.00	19
TOTAL SEAT X	17.83	-346.47	3851.00	3936.00	
SEAT LNK Y	37.42	-91.40	4174.00	3943.00	35
LF SEAT PAN Z	499.85	28.87	3937.00	3632.00	11
RT SEAT PAN Z	588.52	25.69	3939.00	3600.00	12
CT SEAT PAN Z	692.23	29.31	3940.00	3629.00	13
TOTAL SEAT Z	1773.12	97.72	3938.00	3600.00	
TOTAL SEAT Z / WT	11.29	0.62	3938.00	3600.00	
RES SEAT FORCE	1808.70	100.68	3938.00	3600.00	
RES SEAT FORCE / WT	11.52	0.64	3938.00	3600.00	
LF FOOT X	14.01	-105.33	3884.00	3933.00	20
RT FOOT X	34.91	-54.97	3882.00	3942.00	23
CT FOOT X	7.84	-165.68	3883.00	3933.00	26
TOTAL FOOT X	49.69	-324.22	3883.00	3933.00	
LF FOOT Y	117.69	-9.84	3917.00	3994.00	21
RT FOOT Y	18.37	-104.98	4032.00	3934.00	24
CT FOOT Y	16.86	-55.23	3908.00	3934.00	27
TOTAL FOOT Y	51.73	-67.42	3956.00	3936.00	
LF FOOT Z	197.12	-33.71	3918.00	4003.00	22
RT FOOT Z	179.81	-22.60	3943.00	4043.00	25
CT FOOT Z	174.07	-103.00	3947.00	3896.00	28
TOTAL FOOT Z	387.92	-108.76	3918.00	3875.00	
RES FOOT FORCE	492.35	15.66	3943.00	4035.00	

NEG SHLD HAR ANG TEST: 505 SUBJ: M13 WT: 170.0 G: 10 GP: 1 CELL: H

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	1199.00	185.00	48
CARRIAGE X	0.86	-1.23	3904.00	3909.00	35
CARRIAGE Y	0.59	-1.04	3905.00	3866.00	31
CARRIAGE Z	11.42	-0.23	3895.00	3606.00	1
CARRIAGE Z (SM)	10.37	-0.08	3910.00	3722.00	
CARRIAGE VEL	-1.18	-26.17	4197.00	3859.00	29
SEAT X	1.14	-1.64	3904.00	3908.00	32
SEAT Y	0.72	-0.86	3901.00	3897.00	33
SEAT Z	11.38	-0.22	3900.00	3730.00	34
SEAT Z (SM)	10.43	-0.12	3901.00	3731.00	
CHEST X	3.27	-1.64	3912.00	3948.00	5
CHEST Y	-0.41	-2.31	3875.00	3911.00	6
CHEST Z	20.47	-0.83	3921.00	3657.00	7
CHEST RES	20.64	0.82	3921.00	3718.00	
CHEST SI	37.05		3861.00	4110.00	
HEAD X	1.13	-3.41	3914.00	3946.00	2
HEAD Y	2.14	1.18	4001.00	3936.00	3
HEAD Z	13.31	-1.25	3915.00	3721.00	4
HEAD RES	13.46	1.48	3915.00	4147.00	
HEAD SI	19.24		3873.00	3984.00	
HEAD HIC	15.81		3890.00	3955.00	
SHD REFL LF	51.68	23.35	3934.00	4017.00	14
SHD REEL LF	57.46	20.26	3944.00	3903.00	16
LF SHOULDER	104.63	57.95	3936.00	4029.00	
SHD REFL RT	36.78	17.81	3938.00	3896.00	15
SHD REEL RT	40.12	4.92	3948.00	3899.00	17
RT SHOULDER	73.79	23.44	3948.00	3898.00	
TOTAL SHLD REFL	87.41	44.54	3937.00	4000.00	
TOTAL SHLD REEL	95.86	25.82	3947.00	3899.00	
TOTAL SHOULDER	174.82	86.73	3945.00	3897.00	
TOTAL SHD / WT	1.03	0.51	3945.00	3897.00	
LF LAP BELT	48.99	10.91	3997.00	3928.00	8
RT LAP BELT	52.67	9.43	3990.00	3904.00	9
TOTAL LAP	101.43	21.17	3990.00	3903.00	
TOTAL LAP / WT	0.60	0.12	3990.00	3903.00	
CROTCH STRAP	172.24	21.88	4007.00	3908.00	10
LF SEAT LNK X	30.11	-246.43	4164.00	3910.00	18
RT SEAT LNK X	7.19	-126.85	3649.00	3910.00	19
TOTAL SEAT X	20.25	-373.28	3798.00	3910.00	
SEAT LNK Y	56.72	-96.41	4178.00	3916.00	35
LF SEAT PAN Z	431.75	25.66	3918.00	3641.00	11
RT SEAT PAN Z	425.61	25.78	3914.00	3609.00	12
CT SEAT PAN Z	889.27	40.99	3921.00	3608.00	13
TOTAL SEAT Z	1729.38	109.12	3920.00	3604.00	
TOTAL SEAT Z / WT	10.17	0.64	3920.00	3604.00	
RES SEAT FORCE	1765.20	111.50	3920.00	3604.00	
RES SEAT FORCE / WT	10.38	0.66	3920.00	3604.00	
LF FOOT X	6.51	-144.48	3862.00	3914.00	20
RT FOOT X	78.51	-66.88	3863.00	3921.00	23
CT FOOT X	3.04	-191.94	3863.00	3914.00	26
TOTAL FOOT X	88.06	-388.32	3863.00	3914.00	
LF FOOT Y	128.37	-14.01	3915.00	3875.00	21
RT FOOT Y	41.28	-107.81	3869.00	3921.00	24
CT FOOT Y	44.23	-58.11	3865.00	3913.00	27
TOTAL FOOT Y	124.72	-70.64	3869.00	3875.00	
LF FOOT Z	188.19	-57.90	3898.00	3863.00	22
RT FOOT Z	232.49	-23.39	3923.00	3870.00	25
CT FOOT Z	158.49	-116.32	3919.00	3620.00	28
TOTAL FOOT Z	525.48	-30.71	3899.00	3853.00	
RES FOOT FORCE	611.05	49.87	3924.00	3999.00	

NEG SHLD HAR ANG TEST: 500 SUBJ: R-2 WT: 140.0 G: 10 GP: 1 CELL: H

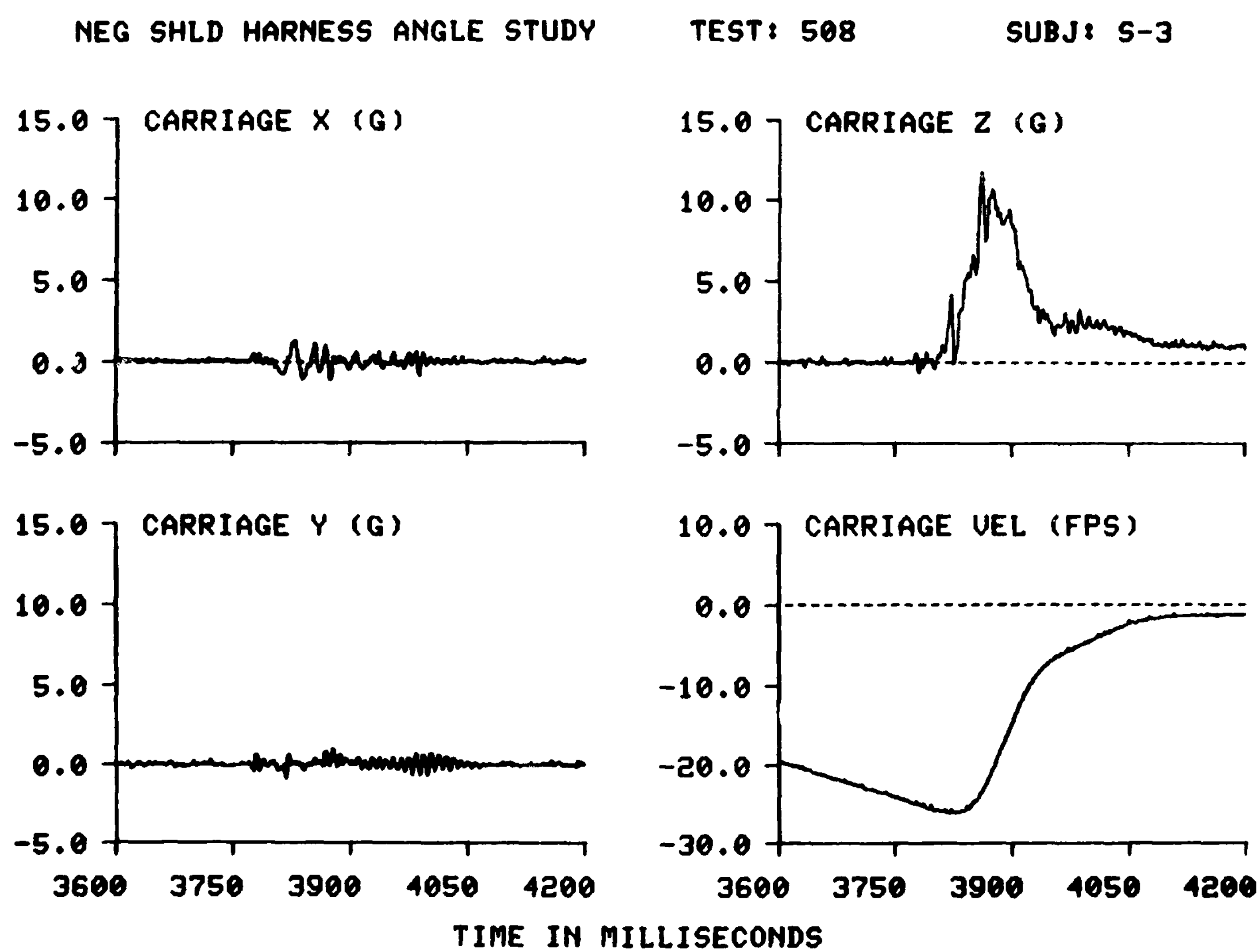
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	533.00	179.00	48
CARRIAGE X	1.36	-1.18	3841.00	3813.00	36
CARRIAGE Y	0.80	-0.75	3842.00	3787.00	31
CARRIAGE Z	12.68	-0.20	3834.00	3663.00	1
CARRIAGE Z (SM)	10.69	-0.05	3834.00	3664.00	
CARRIAGE VEL	-0.92	-25.94	4146.00	3795.00	29
SEAT X	1.56	-1.13	3842.00	3811.00	32
SEAT Y	0.58	-1.12	3854.00	3803.00	33
SEAT Z	11.42	-0.15	3839.00	3654.00	34
SEAT Z (SM)	10.72	-0.08	3841.00	3654.00	
CHEST X	4.09	-0.29	3855.00	3610.00	5
CHEST Y	-0.13	-1.60	3874.00	3851.00	6
CHEST Z	17.05	-1.00	3866.00	3717.00	7
CHEST RES	17.34	0.77	3866.00	3702.00	
CHEST SI	25.66		3797.00	4027.00	
HEAD X	.57	-4.43	3797.00	3879.00	2
HEAD Y	1.40	-1.46	3976.00	3952.00	3
HEAD Z	13.81	-1.07	3853.00	3766.00	4
HEAD RES	13.97	0.62	3853.00	3801.00	
HEAD SI	19.85		3805.00	3931.00	
HEAD HIC	15.62		3827.00	3896.00	
SHD REFL LF	58.76	17.62	3871.00	4095.00	14
SHD REEL LF	40.17	10.31	3883.00	3846.00	16
LF SHOULDER	89.39	40.62	3873.00	4100.00	
SHD REFL RT	37.01	20.47	3871.00	4080.00	15
SHD REEL RT	36.03	3.78	3928.00	3854.00	17
RT SHOULDER	67.11	36.41	3929.00	3856.00	
TOTAL SHLD REFL	95.77	38.93	3871.00	4093.00	
TOTAL SHLD REEL	72.24	14.23	3916.00	3845.00	
TOTAL SHOULDER	148.30	82.91	3881.00	4100.00	
TOTAL SHD / WT	1.07	0.59	3881.00	4100.00	
LF LAP BELT	50.62	14.52	3936.00	3862.00	8
RT LAP BELT	58.86	24.74	3932.00	3845.00	9
TOTAL LAP	107.63	42.99	3934.00	3861.00	
TOTAL LAP / WT	0.77	0.31	3934.00	3861.00	
CROTCH STRAP	138.38	38.91	3937.00	3855.00	10
LF SEAT LNK X	88.67	-142.76	4052.00	3846.00	18
RT SEAT LNK X	67.74	-24.50	3802.00	3849.00	19
TOTAL SEAT X	96.41	-166.03	4051.00	3848.00	
SEAT LNK Y	64.57	-49.67	3936.00	3847.00	35
LF SEAT PAN Z	367.62	19.09	3849.00	3622.00	11
RT SEAT PAN Z	452.34	26.06	3856.00	3613.00	12
CT SEAT PAN Z	804.29	84.15	3851.00	3608.00	13
TOTAL SEAT Z	1601.32	144.20	3852.00	3601.00	
TOTAL SEAT Z / WT	11.44	1.03	3852.00	3601.00	
RES SEAT FORCE	1609.85	152.63	3852.00	3601.00	
RES SEAT FORCE / WT	11.50	1.09	3852.00	3601.00	
LF FOOT X	13.42	-120.39	3800.00	3853.00	20
RT FOOT X	50.09	-39.79	3841.00	3861.00	23
CT FOOT X	23.31	-171.67	3800.00	3852.00	26
TOTAL FOOT X	71.83	-324.80	3800.00	3853.00	
LF FOOT Y	101.58	-9.35	3836.00	3923.00	21
RT FOOT Y	18.55	-101.26	3888.00	3844.00	24
CT FOOT Y	19.49	-49.04	3822.00	3856.00	27
TOTAL FOOT Y	46.71	-38.94	3889.00	3924.00	
LF FOOT Z	147.05	-36.58	3861.00	3810.00	22
RT FOOT Z	152.21	-19.77	3862.00	3808.00	25
CT FOOT Z	155.26	-82.59	3866.00	3791.00	28
TOTAL FOOT Z	400.11	-111.11	3845.00	3810.00	
RES FOOT FORCE	479.23	17.55	3862.00	3803.00	

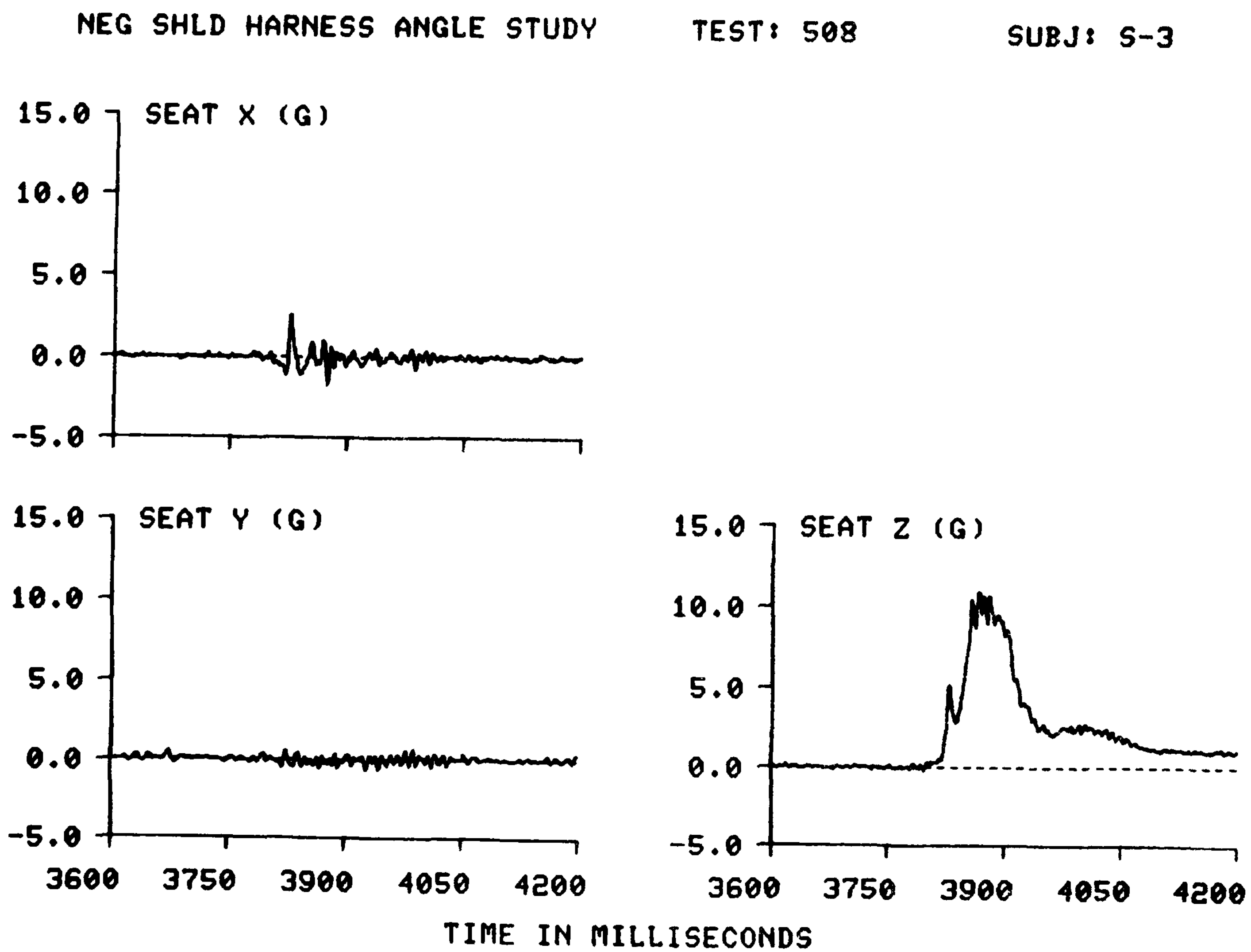
NEG SHLD HAR ANG TEST: 499 SUBJ: R-3 WT: 150.0 G: 10 GP: 1 CELL: H

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	1506.00	21.00	48
CARRIAGE X	1.25	-1.17	3894.00	3887.00	36
CARRIAGE Y	0.75	-0.63	3896.00	3868.00	31
CARRIAGE Z	12.66	-0.26	3888.00	3808.00	1
CARRIAGE Z (SM)	10.51	-0.10	3888.00	3810.00	
CARRIAGE VEL	-1.06	-25.99	4175.00	3836.00	29
SEAT X	1.04	-1.16	3896.00	3901.00	32
SEAT Y	1.14	-1.51	3851.00	3859.00	33
SEAT Z	11.45	-0.24	3894.00	3723.00	34
SEAT Z (SM)	10.62	-0.11	3895.00	3722.00	
CHEST X	3.79	-1.10	3907.00	3943.00	5
CHEST Y	-0.45	-2.30	3890.00	3916.00	6
CHEST Z	20.70	-0.94	3919.00	3821.00	7
CHEST RES	21.10	0.89	3919.00	3777.00	
CHEST SI	38.44		3851.00	4092.00	
HEAD X	.58	-5.23	3849.00	3939.00	2
HEAD Y	3.28	0.98	4037.00	3923.00	3
HEAD Z	11.85	-1.62	3908.00	3651.00	4
HEAD RES	12.07	1.76	3908.00	4154.00	
HEAD SI	17.32		3865.00	3988.00	
HEAD HIC	13.74		3882.00	3962.00	
SHD REFL LF	48.92	20.43	3937.00	4100.00	14
SHD REEL LF	32.01	2.72	3972.00	3903.00	16
LF SHOULDER	72.89	38.30	3938.00	4022.00	
SHD REFL RT	37.21	22.62	3896.00	4009.00	15
SHD REEL RT	40.85	-0.60	3972.00	3906.00	17
RT SHOULDER	76.75	24.78	3969.00	4042.00	
TOTAL SHLD REFL	82.90	49.14	3937.00	4100.00	
TOTAL SHLD REEL	72.87	2.97	3972.00	3905.00	
TOTAL SHOULDER	144.27	63.73	3970.00	4042.00	
TOTAL SHD / WT	0.96	0.42	3970.00	4042.00	
LF LAP BELT	48.01	20.11	3948.00	3895.00	8
RT LAP BELT	67.06	25.03	3957.00	3899.00	9
TOTAL LAP	114.72	46.44	3957.00	3897.00	
TOTAL LAP / WT	0.76	0.31	3957.00	3897.00	
CROTCH STRAP	138.25	7.77	3994.00	3915.00	10
LF SEAT LNK X	36.84	-155.01	3820.00	3907.00	18
RT SEAT LNK X	24.14	-70.55	3847.00	3911.00	19
TOTAL SEAT X	50.30	-224.33	3826.00	3910.00	
SEAT LNK Y	37.83	-99.50	3986.00	3909.00	35
LF SEAT PAN Z	506.42	41.92	3905.00	3623.00	11
RT SEAT PAN Z	540.51	53.38	3911.00	3608.00	12
CT SEAT PAN Z	645.17	62.26	3911.00	3600.00	13
TOTAL SEAT Z	1678.47	168.68	3911.00	3600.00	
TOTAL SEAT Z / WT	11.19	1.12	3911.00	3600.00	
RES SEAT FORCE	1695.69	170.53	3911.00	3600.00	
RES SEAT FORCE / WT	11.30	1.14	3911.00	3600.00	
LF FOOT X	18.55	-91.75	3855.00	3901.00	20
RT FOOT X	52.62	-17.87	3894.00	3925.00	23
CT FOOT X	36.46	-139.74	3855.00	3907.00	26
TOTAL FOOT X	81.20	-235.18	3855.00	3906.00	
LF FOOT Y	109.31	-5.12	3890.00	3602.00	21
RT FOOT Y	29.85	-86.40	3854.00	3898.00	24
CT FOOT Y	15.91	-56.17	3634.00	3899.00	27
TOTAL FOOT Y	49.48	-53.73	3874.00	3861.00	
LF FOOT Z	158.74	-47.88	3891.00	3847.00	22
RT FOOT Z	125.59	-15.49	3899.00	3886.00	25
CT FOOT Z	146.56	-77.08	3896.00	3864.00	28
TOTAL FOOT Z	370.07	-97.15	3891.00	3846.00	
RES FOOT FORCE	408.06	4.68	3891.00	3656.00	

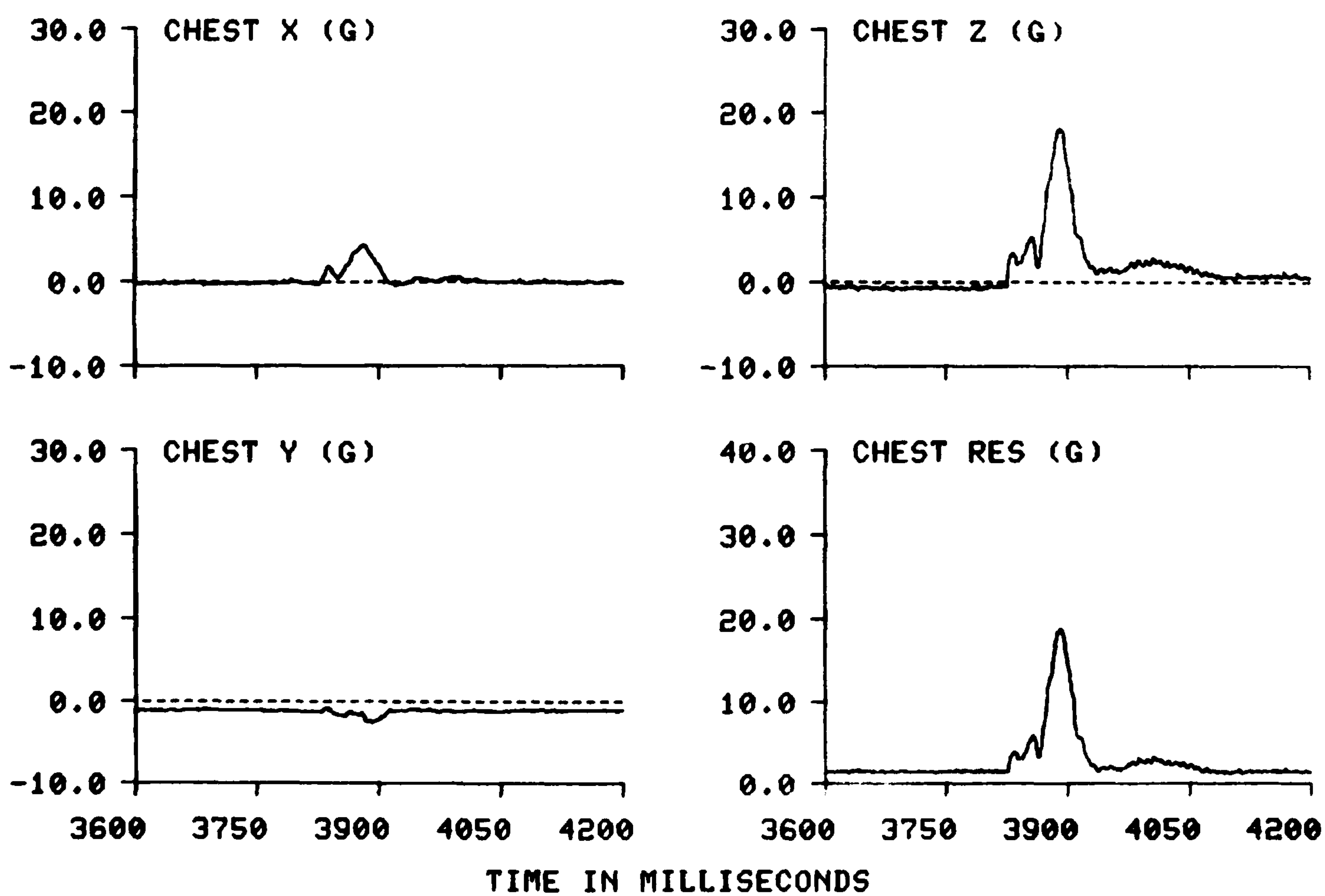
NEG SHLD HAR ANG TEST: 508 SUBJ: [illegible] WT: [illegible]

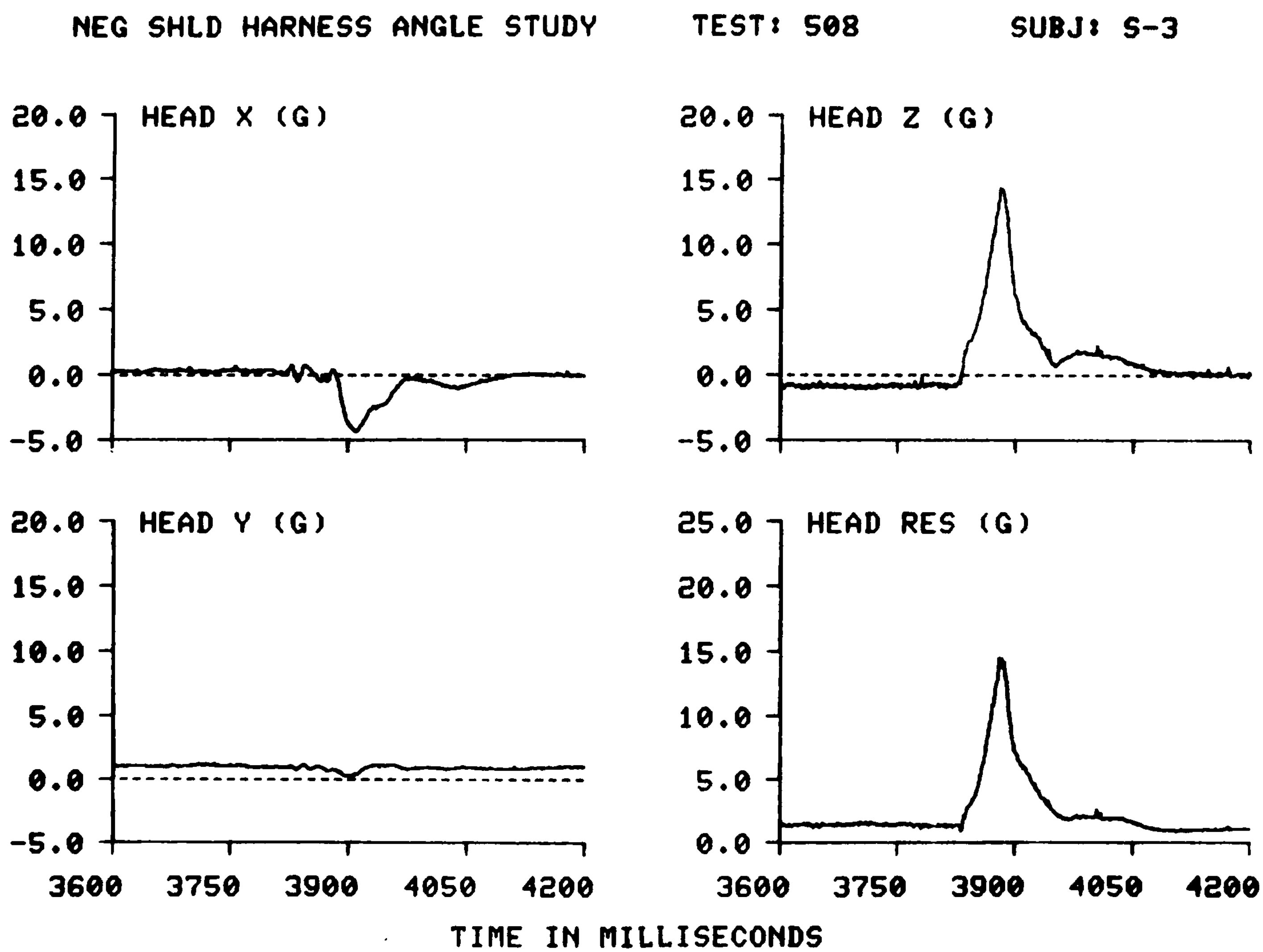
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.25	9.97	829.00	1465.00	48
CARRIAGE X	1.28	1.10	3828.00	3838.00	36
CARRIAGE Y	0.95	0.92	3878.00	3817.00	31
CARRIAGE Z	11.77	-0.61	3860.00	3780.00	1
CARRIAGE Z (SM)	10.24	-0.18	3861.00	3782.00	
CARRIAGE VEL	-1.03	26.23	4108.00	3826.00	29
SEAT X	2.54	-1.73	3826.00	3873.00	32
SEAT Y	0.64	-0.67	3989.00	3929.00	33
SEAT Z	10.88	-0.23	3866.00	3730.00	34
SEAT Z (SM)	10.19	-0.13	3867.00	3679.00	
CHEST X	4.36	0.39	3882.00	3685.00	5
CHEST Y	-0.87	-2.62	3837.00	3893.00	6
CHEST Z	18.24	-1.11	3890.00	3642.00	7
CHEST RES	18.69	1.13	3890.00	3736.00	
CHEST SI	34.05		3827.00	3936.00	
HEAD X	0.76	-4.36	3845.00	3909.00	2
HEAD Y	1.22	0.21	3710.00	3899.00	3
HEAD Z	14.34	-1.09	3880.00	3704.00	4
HEAD RES	14.36	0.83	3880.00	4119.00	
HEAD SI	19.78		3835.00	3963.00	
HEAD HIC	15.15		3857.00	3916.00	
SHD REFL LF	54.97	13.33	3893.00	4092.00	14
SHD REEL LF	44.86	5.69	3908.00	3881.00	16
LF SHOULDER	91.44	39.26	3905.00	4094.00	
SHD REFL RT	24.55	13.22	3903.00	3965.00	15
SHD REEL RT	31.01	7.75	3931.00	3860.00	17
RT SHOULDER	48.60	25.39	3932.00	3860.00	
TOTAL SHLD REFL	78.17	28.13	3894.00	4100.00	
TOTAL SHLD REEL	63.60	16.00	3937.00	3873.00	
TOTAL SHOULDER	125.04	66.52	3905.00	3862.00	
TOTAL SHD / WT	0.74	0.40	3905.00	3862.00	
LF LAP BELT	50.78	26.28	3944.00	3863.00	8
RT LAP BELT	52.79	27.18	3921.00	3861.00	9
TOTAL LAP	100.13	53.51	3921.00	3862.00	
TOTAL LAP / WT	0.60	0.32	3921.00	3862.00	
CROTCH STRAP	86.11	-32.07	4098.00	3880.00	10
LF SEAT LNK X	46.63	-199.37	3810.00	3883.00	18
RT SEAT LNK X	25.05	-91.78	3828.00	3886.00	19
TOTAL SEAT X	47.70	-290.54	3810.00	3883.00	
SEAT LNK Y	36.18	-96.90	4122.00	3882.00	35
LF SEAT PAN Z	548.54	47.87	3876.00	3641.00	11
RT SEAT PAN Z	593.04	44.83	3877.00	3640.00	12
CT SEAT PAN Z	745.25	42.07	3884.00	3613.00	13
TOTAL SEAT Z	1871.18	147.37	3883.00	3600.00	
TOTAL SEAT Z / WT	11.14	0.88	3883.00	3600.00	
RES SEAT FORCE	1895.96	153.77	3883.00	3600.00	
RES SEAT FORCE / WT	11.29	0.92	3883.00	3600.00	
LF FOOT X	12.71	-120.19	3829.00	3873.00	20
RT FOOT X	49.31	-53.79	3828.00	3873.00	23
CT FOOT X	21.22	-208.65	3830.00	3874.00	26
TOTAL FOOT X	81.46	-379.95	3829.00	3873.00	
LF FOOT Y	119.63	-18.38	3862.00	3712.00	21
RT FOOT Y	14.89	-112.90	3691.00	3872.00	24
CT FOOT Y	43.15	-45.85	3691.00	3878.00	27
TOTAL FOOT Y	56.79	-36.33	3898.00	3875.00	
LF FOOT Z	156.69	-16.57	3888.00	3839.00	22
RT FOOT Z	198.27	-16.93	3873.00	3983.00	25
CT FOOT Z	200.89	-94.28	3868.00	3841.00	28
TOTAL FOOT Z	453.24	-121.42	3872.00	3839.00	
RES FOOT FORCE	581.96	55.63	3872.00	4000.00	

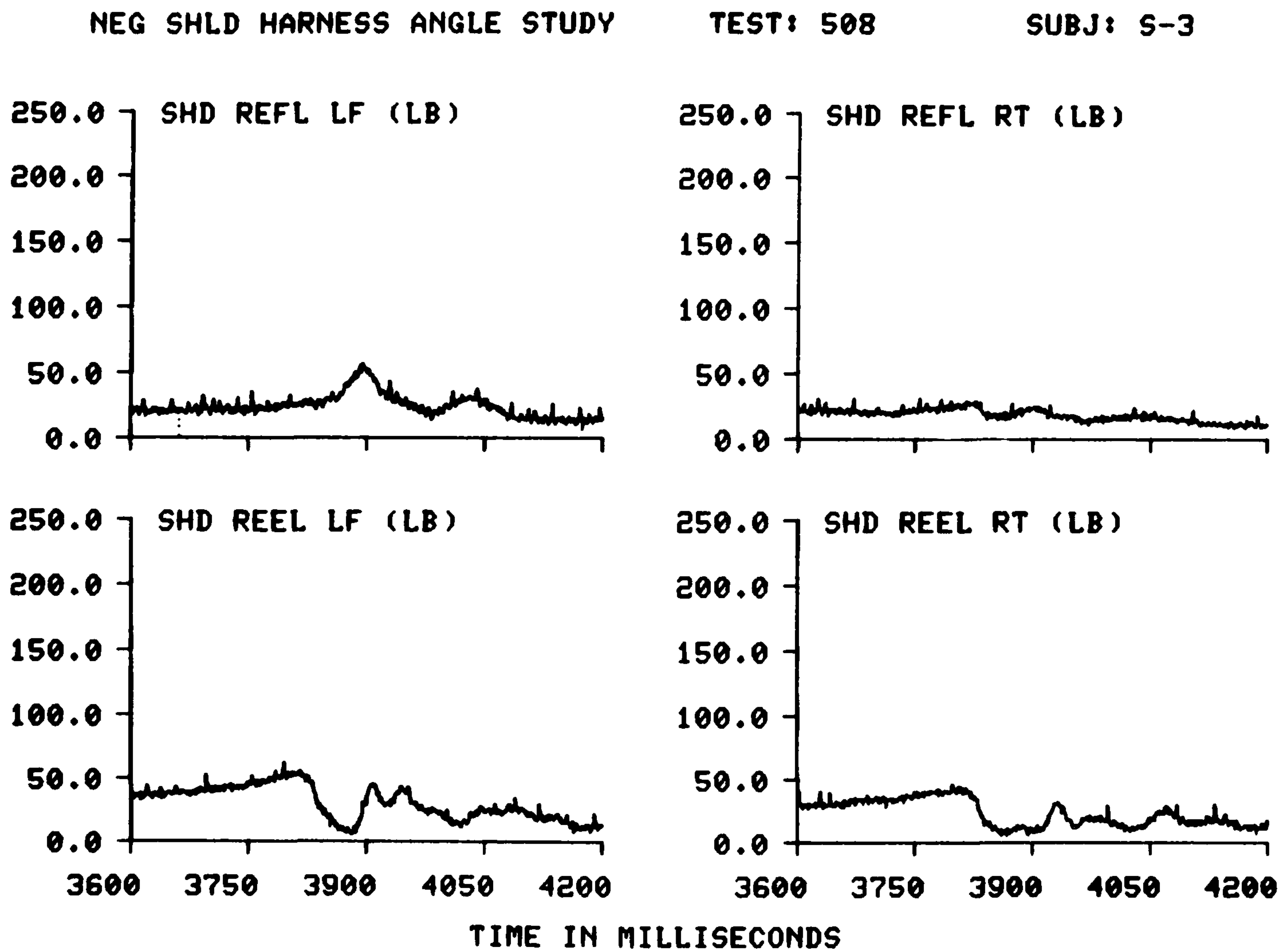

NEG SHLD HARNESS ANGLE STUDY
TEST: 508
SUBJ: S-3
CARRIAGE X (G)
CARRIAGE Z (G)
CARRIAGE Y (G)
CARRIAGE VEL (FPS)
15.0
10.0
5.0
0.3
0.0
-5.0
-10.0
-20.0
-30.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


NEG SHLD HARNESS ANGLE STUDY
TEST: 508
SUBJ: S-3
SEAT X (G)
SEAT Y (G)
SEAT Z (G)
15.0
10.0
5.0
0.0
-5.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

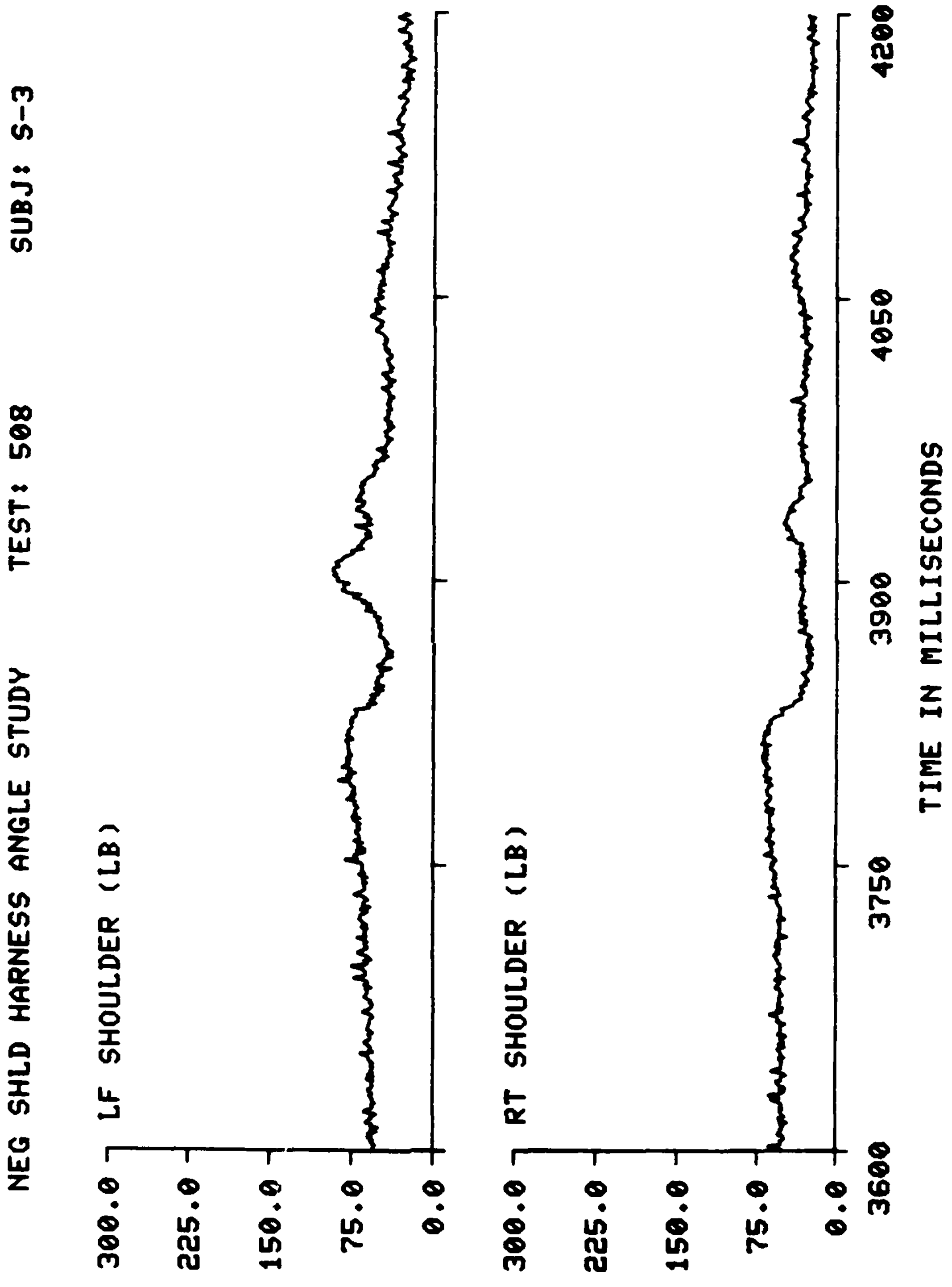
NEG SHLD HARNESS ANGLE STUDY TEST: 508 SUBJ: S-3

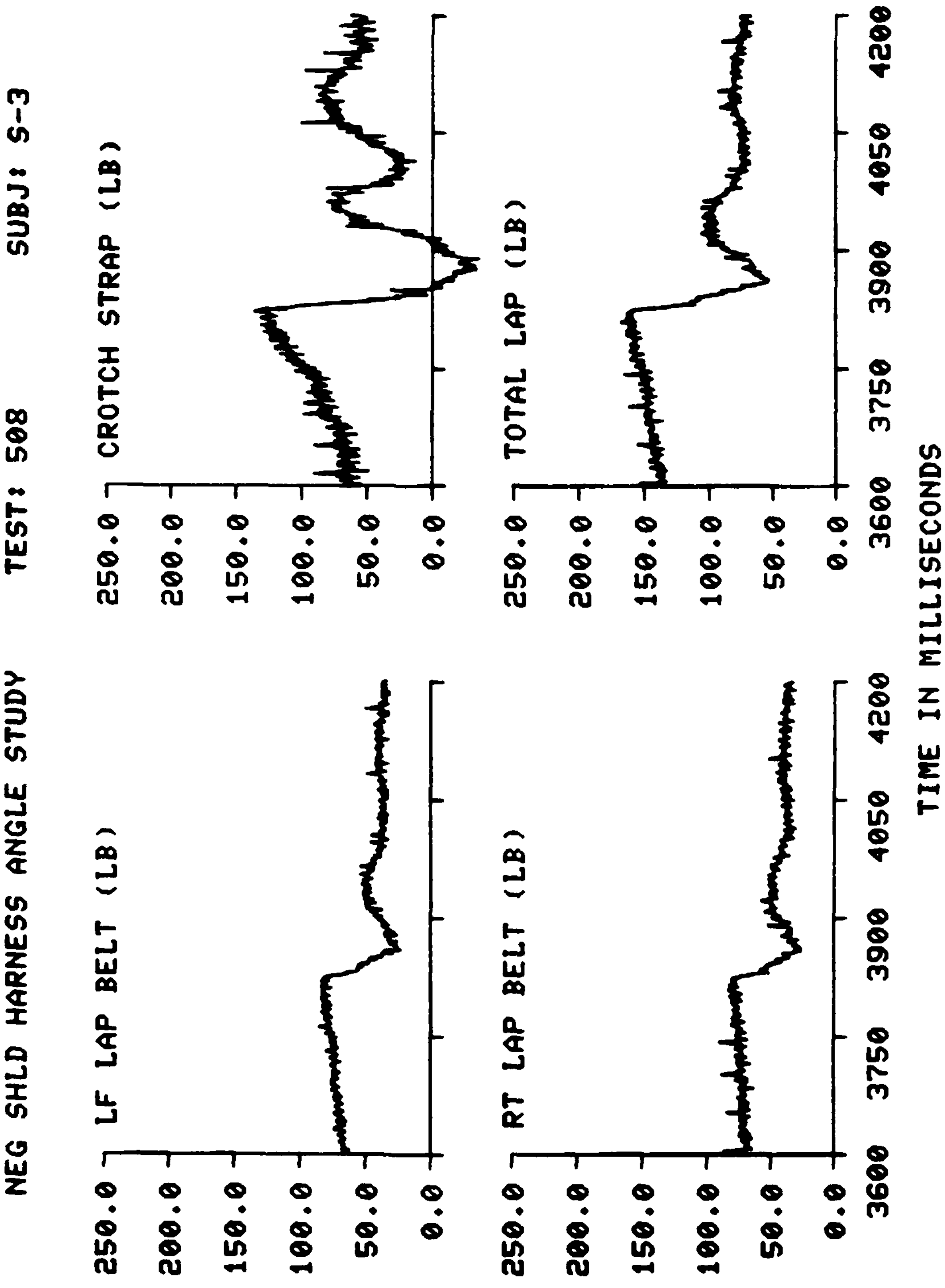


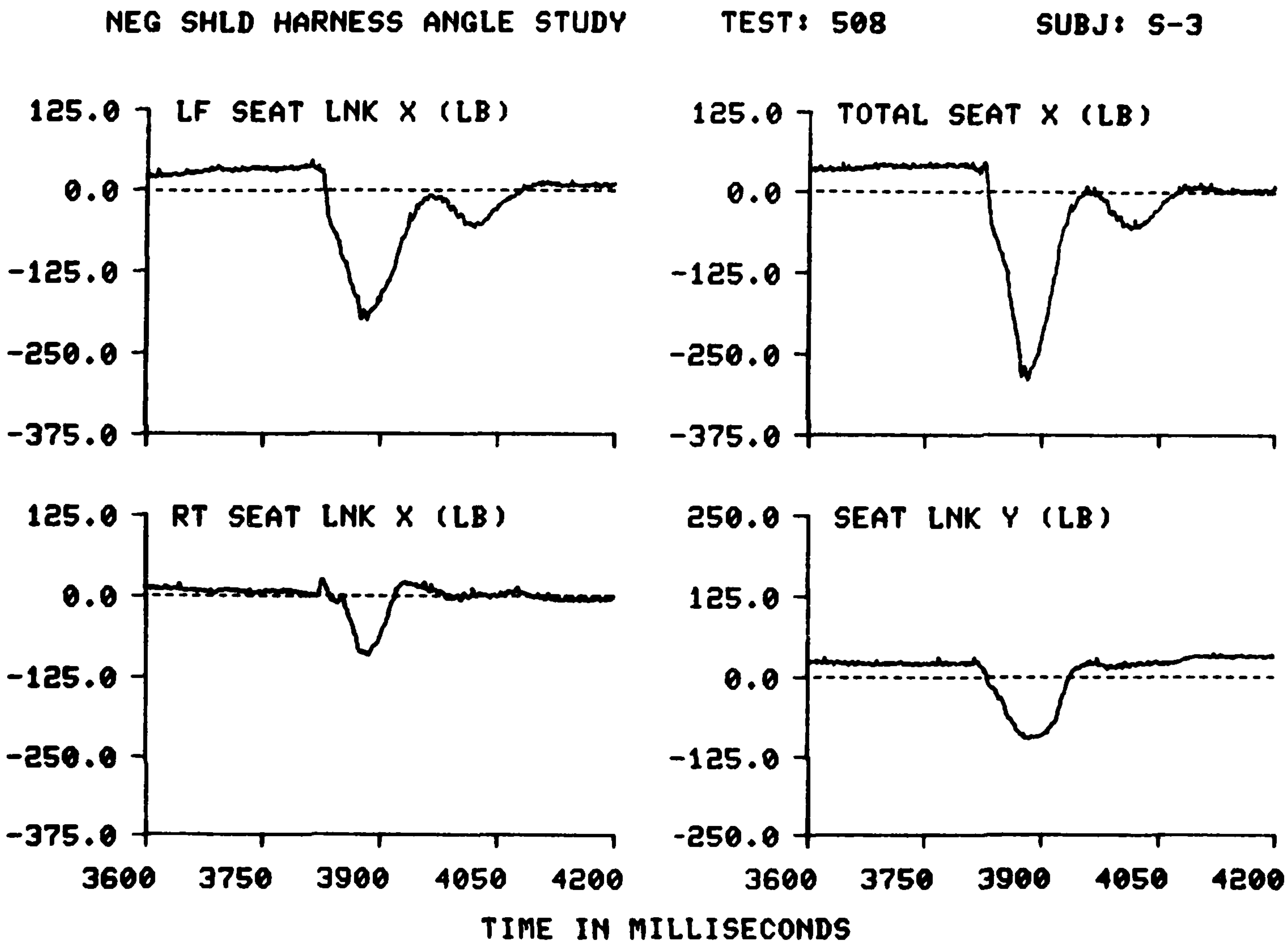

NEG SHLD HARNESS ANGLE STUDY
TEST: 508
SUBJ: S-3
HEAD X (G)
HEAD Z (G)
HEAD Y (G)
HEAD RES (G)
20.0
15.0
10.0
5.0
0.0
-5.0
25.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS



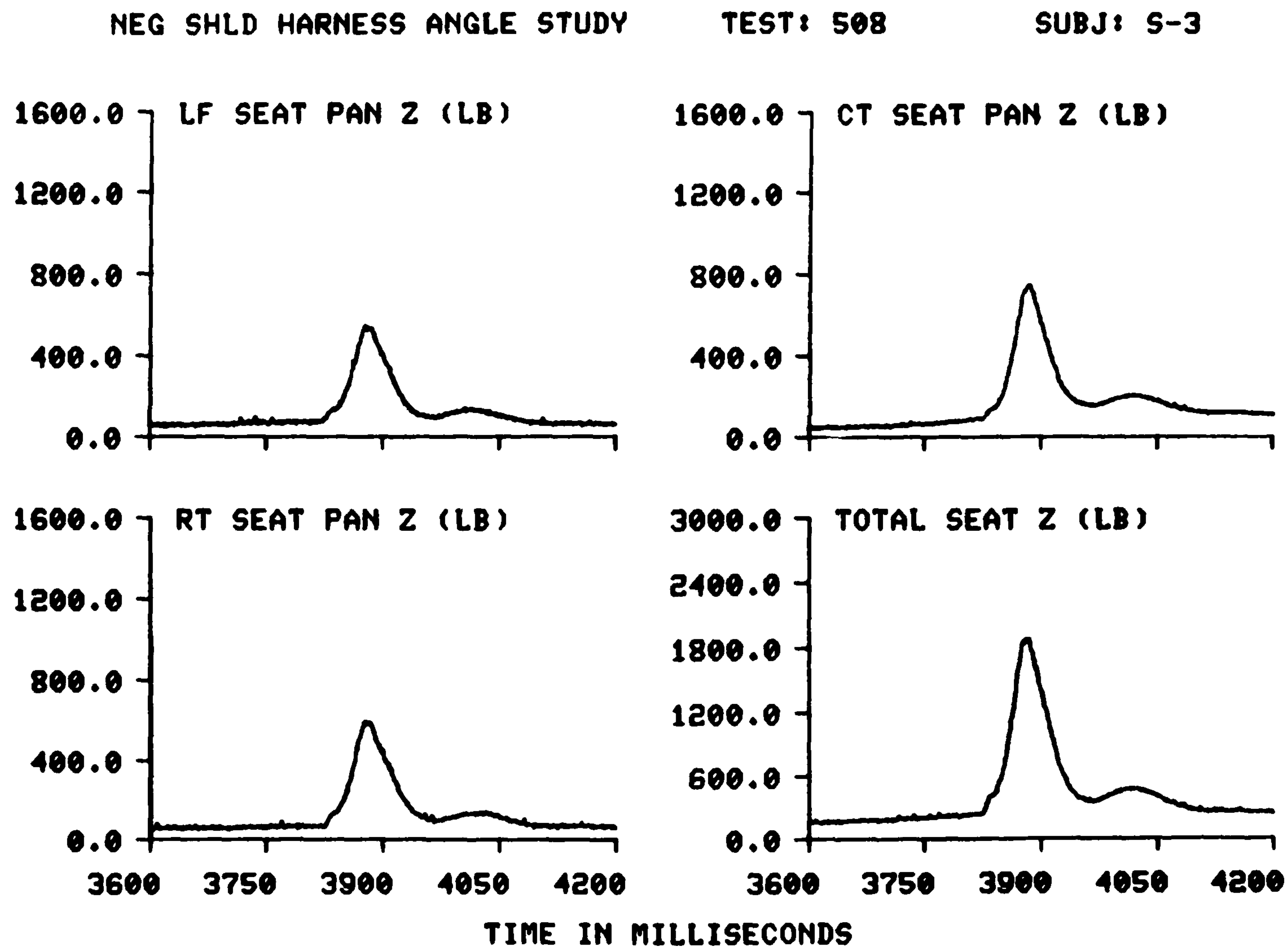
NEG SHLD HARNESS ANGLE STUDY
TEST: 508
SUBJ: S-3
SHD REFL LF (LB)
SHD REFL RT (LB)
SHD REEL LF (LB)
SHD REEL RT (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

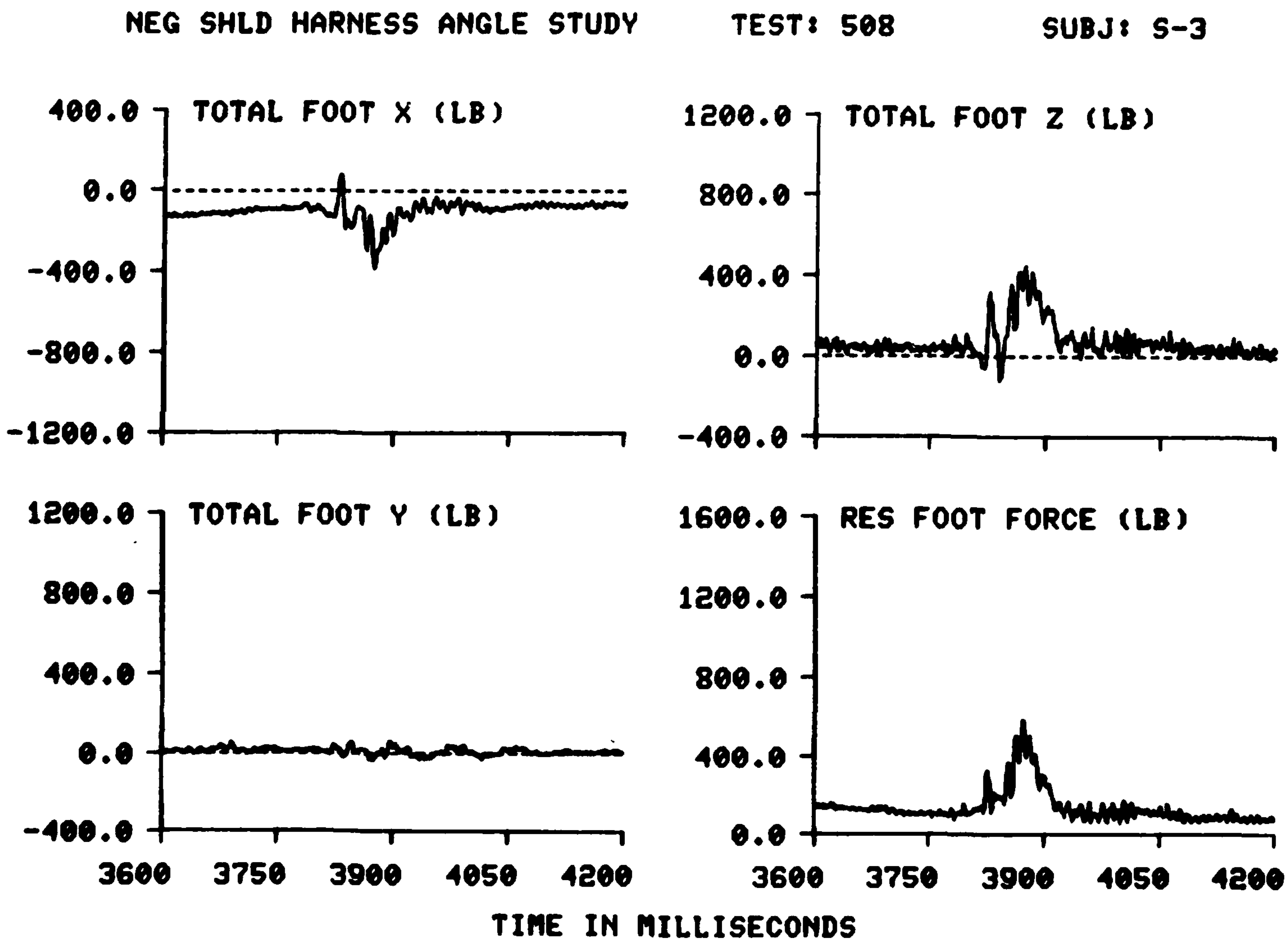

NEG SHLD HARNESS ANGLE STUDY
TEST: 508
SUBJ: S-3
LF SHOULDER (LB)
300.0
225.0
150.0
75.0
0.0
RT SHOULDER (LB)
300.0
225.0
150.0
75.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


NEG SHLD HARNESS ANGLE STUDY
TEST: 508
SUBJ: S-3
LF LAP BELT (LB)
CROTCH STRAP (LB)
RT LAP BELT (LB)
TOTAL LAP (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS



NEG SHLD HARNESS ANGLE STUDY
TEST: 508
SUBJ: S-3
LF SEAT LNK X (LB)
TOTAL SEAT X (LB)
RT SEAT LNK X (LB)
SEAT LNK Y (LB)
125.0
0.0
-125.0
-250.0
-375.0
250.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


NEG SHLD HARNESS ANGLE STUDY
TEST: 508
SUBJ: S-3
LF SEAT PAN Z (LB)
CT SEAT PAN Z (LB)
RT SEAT PAN Z (LB)
TOTAL SEAT Z (LB)
1600.0
1200.0
800.0
400.0
0.0
3000.0
2400.0
1800.0
1200.0
600.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


NEG SHLD HARNESS ANGLE STUDY
TEST: 508
SUBJ: S-3
TOTAL FOOT X (LB)
400.0
0.0
-400.0
-800.0
-1200.0
TOTAL FOOT Z (LB)
1200.0
800.0
400.0
0.0
-400.0
TOTAL FOOT Y (LB)
1200.0
800.0
400.0
0.0
-400.0
RES FOOT FORCE (LB)
1600.0
1200.0
800.0
400.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

NEG SHLD HAR ANG TEST: 494 SUBJ: F-3 WT: 160.0 G: 10 GP: 1 CELL: J

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	414.00	226.00	48
CARRIAGE X	1.14	-1.10	3864.00	3849.00	36
CARRIAGE Y	0.88	-0.87	3891.00	3822.00	31
CARRIAGE Z	12.82	-0.30	3870.00	3767.00	1
CARRIAGE Z (SM)	10.24	-0.07	3870.00	3693.00	
CARRIAGE VEL	-1.04	-26.21	4165.00	3827.00	29
SEAT X	1.29	-1.21	3843.00	3849.00	32
SEAT Y	0.79	-0.86	3837.00	3957.00	33
SEAT Z	11.60	-0.24	3868.00	3675.00	34
SEAT Z (SM)	10.32	-0.14	3877.00	3675.00	
CHEST X	1.57	-2.87	3885.00	3929.00	5
CHEST Y	-0.10	-2.08	3928.00	3882.00	6
CHEST Z	16.14	-0.73	3900.00	3684.00	7
CHEST RES	16.15	0.81	3900.00	3609.00	
CHEST SI	33.19		3835.00	4083.00	
HEAD X	2.80	-1.65	3895.00	3936.00	2
HEAD Y	3.00	-0.18	3963.00	3891.00	3
HEAD Z	12.25	-1.61	3894.00	3960.00	4
HEAD RES	12.56	1.39	3894.00	4056.00	
HEAD SI	20.15		3847.00	3946.00	
HEAD HIC	17.54		3867.00	3935.00	
SHD REFL LF	42.85	6.96	3954.00	3860.00	14
SHD REEL LF	50.06	7.15	3928.00	3885.00	16
LF SHOULDER	82.54	16.00	3931.00	3881.00	
SHD REFL RT	36.18	8.78	4092.00	3870.00	15
SHD REEL RT	56.66	4.22	3933.00	3895.00	17
RT SHOULDER	83.52	14.28	3936.00	3893.00	
TOTAL SHLD REFL	70.89	16.35	3955.00	3880.00	
TOTAL SHLD REEL	104.54	12.26	3930.00	3894.00	
TOTAL SHOULDER	163.51	36.00	3933.00	3890.00	
TOTAL SHD / WT	1.02	0.22	3933.00	3890.00	
LF LAP BELT	47.93	15.81	3967.00	3878.00	8
RT LAP BELT	83.22	27.41	3959.00	3878.00	9
TOTAL LAP	130.30	43.22	3967.00	3878.00	
TOTAL LAP / WT	0.81	0.27	3967.00	3878.00	
CROTCH STRAP	72.94	-18.65	4085.00	3931.00	10
LF SEAT LNK X	32.90	-190.64	3620.00	3889.00	18
RT SEAT LNK X	27.85	-103.32	3602.00	3892.00	19
TOTAL SEAT X	53.63	-292.12	3602.00	3889.00	
SEAT LNK Y	18.00	-126.02	4187.00	3898.00	35
LF SEAT PAN Z	628.35	61.24	3894.00	3628.00	11
RT SEAT PAN Z	633.07	90.49	3891.00	3695.00	12
CT SEAT PAN Z	489.46	24.07	3894.00	3693.00	13
TOTAL SEAT Z	1729.73	191.14	3894.00	3602.00	
TOTAL SEAT Z / WT	10.81	1.19	3894.00	3602.00	
RES SEAT FORCE	1757.83	198.78	3894.00	3602.00	
RES SEAT FORCE / WT	10.99	1.24	3894.00	3602.00	
LF FOOT X	-15.10	-136.25	4139.00	3883.00	20
RT FOOT X	36.82	-42.49	3878.00	3852.00	23
CT FOOT X	-13.49	-182.53	3843.00	3884.00	26
TOTAL FOOT X	-15.01	-344.47	3842.00	3883.00	
LF FOOT Y	125.20	-11.93	3871.00	4001.00	21
RT FOOT Y	21.58	-106.21	3939.00	3889.00	24
CT FOOT Y	20.34	-59.75	3992.00	3891.00	27
TOTAL FOOT Y	61.99	-59.93	3995.00	3947.00	
LF FOOT Z	205.28	-24.63	3873.00	3851.00	22
RT FOOT Z	201.22	-12.15	3839.00	3994.00	25
CT FOOT Z	150.47	-181.55	3878.00	3853.00	28
TOTAL FOOT Z	439.44	-143.33	3838.00	3852.00	
RES FOOT FORCE	468.63	66.93	3872.00	3843.00	

NEG SHLD HAR ANG TEST: 481 SUBJ: F-2 WT: 160.0 G: 10 GP: 1 CELL: J

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	272.00	89.00	48
CARRIAGE X	1.10	-1.07	3845.00	3853.00	36
CARRIAGE Y	0.74	-0.49	3847.00	3811.00	31
CARRIAGE Z	12.56	-0.17	3839.00	3703.00	1
CARRIAGE Z (SM)	10.49	-0.06	3839.00	3655.00	
CARRIAGE VEL	-0.93	-26.11	4153.00	3797.00	29
SEAT X	1.06	-1.26	3848.00	3852.00	32
SEAT Y	0.71	-1.20	3808.00	3814.00	33
SEAT Z	11.62	-0.29	3845.00	3725.00	34
SEAT Z (SM)	10.54	-0.16	3846.00	3724.00	
CHEST X	1.87	-3.60	3860.00	3902.00	5
CHEST Y	-0.30	-2.00	3908.00	3859.00	6
CHEST Z	19.04	-0.58	3869.00	3728.00	7
CHEST RES	19.11	0.83	3869.00	3723.00	
CHEST SI	36.00		3801.00	3935.00	
HEAD X	3.01	-2.52	3861.00	3901.00	2
HEAD Y	2.11	-0.18	3882.00	3973.00	3
HEAD Z	13.50	-1.27	3864.00	3972.00	4
HEAD RES	13.85	1.29	3864.00	3941.00	
HEAD SI	22.56		3815.00	3929.00	
HEAD HIC	18.58		3836.00	3899.00	
SHD REFL LF	27.33	5.28	3907.00	3853.00	14
SHD REEL LF	54.76	4.66	3903.00	3851.00	16
LF SHOULDER	80.79	10.39	3904.00	3852.00	
SHD REFL RT	31.15	4.00	3901.00	3848.00	15
SHD REEL RT	50.38	3.83	3902.00	3940.00	17
RT SHOULDER	81.50	10.18	3902.00	3841.00	
TOTAL SHLD REFL	58.95	10.79	3900.00	3852.00	
TOTAL SHLD REEL	104.97	10.27	3902.00	3939.00	
TOTAL SHOULDER	161.82	22.17	3902.00	3852.00	
TOTAL SHD / WT	1.01	0.14	3902.00	3852.00	
LF LAP BELT	46.99	20.93	3924.00	3875.00	8
RT LAP BELT	58.71	24.65	3931.00	3843.00	9
TOTAL LAP	101.53	46.53	3932.00	3875.00	
TOTAL LAP / WT	0.63	0.29	3932.00	3875.00	
CROTCH STRAP	126.82	-6.51	3945.00	3869.00	10
LF SEAT LNK X	10.31	-270.84	3609.00	3860.00	18
RT SEAT LNK X	-4.13	-108.66	3600.00	3859.00	19
TOTAL SEAT X	1.88	-379.50	3609.00	3860.00	
SEAT LNK Y	35.24	-134.90	3962.00	3859.00	35
LF SEAT PAN Z	658.44	48.37	3863.00	3602.00	11
RT SEAT PAN Z	418.37	36.05	3861.00	3601.00	12
CT SEAT PAN Z	582.18	25.10	3863.00	3666.00	13
TOTAL SEAT Z	1625.09	126.27	3863.00	3601.00	
TOTAL SEAT Z / WT	10.16	0.79	3863.00	3601.00	
RES SEAT FORCE	1670.77	126.35	3863.00	3601.00	
RES SEAT FORCE / WT	10.44	0.79	3863.00	3601.00	
LF FOOT X	7.83	-61.79	3931.00	3859.00	20
RT FOOT X	20.69	-71.83	3725.00	3857.00	23
CT FOOT X	-36.69	-217.36	3805.00	3857.00	26
TOTAL FOOT X	-19.67	-350.08	3804.00	3857.00	
LF FOOT Y	120.38	-14.13	3841.00	3909.00	21
RT FOOT Y	17.77	-140.20	4196.00	3850.00	24
CT FOOT Y	40.21	-22.98	3820.00	3996.00	27
TOTAL FOOT Y	69.57	-71.70	3818.00	3812.00	
LF FOOT Z	192.96	3.57	3843.00	3989.00	22
RT FOOT Z	189.13	16.74	3843.00	4126.00	25
CT FOOT Z	273.22	-51.67	3846.00	3605.00	28
TOTAL FOOT Z	535.95	22.24	3843.00	4126.00	
RES FOOT FORCE	582.49	94.91	3850.00	4126.00	

NEG SHLD HAR ANG TEST: 486 SUBJ: G-3 WT: 164.0 G: 10 GP: 1 CELL: J

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	965.00	159.00	48
CARRIAGE X	1.19	-1.50	3868.00	3875.00	25
CARRIAGE Y	0.75	-0.67	3996.00	3991.00	31
CARRIAGE Z	12.64	-0.18	3861.00	3610.00	1
CARRIAGE Z (SM)	10.53	-0.08	3876.00	3611.00	
CARRIAGE VEL	-0.93	-26.30	4164.00	3823.00	29
SEAT X	1.36	-1.86	3870.00	3874.00	32
SEAT Y	1.37	-1.83	3824.00	3830.00	33
SEAT Z	11.73	-0.16	3867.00	3687.00	34
SEAT Z (SM)	10.56	-0.09	3868.00	3685.00	
CHEST X	4.45	-2.79	3876.00	3923.00	5
CHEST Y	0.18	-3.46	3896.00	3883.00	6
CHEST Z	19.17	-0.91	3901.00	3681.00	7
CHEST RES	19.18	1.07	3901.00	3818.00	
CHEST SI	31.80		3825.00	4065.00	
HEAD X	3.14	-4.08	3878.00	3927.00	2
HEAD Y	2.45	0.39	3977.00	3908.00	3
HEAD Z	11.64	-1.24	3877.00	3698.00	4
HEAD RES	12.11	1.54	3877.00	4058.00	
HEAD SI	18.52		3835.00	3952.00	
HEAD HIC	15.63		3855.00	3926.00	
SHD REFL LF	44.86	7.79	3908.00	3863.00	14
SHD REEL LF	80.78	0.91	3910.00	4013.00	16
LF SHOULDER	124.95	11.34	3909.00	3863.00	
SHD REFL RT	35.29	7.17	3916.00	3869.00	15
SHD REEL RT	68.92	-3.66	3915.00	4015.00	17
RT SHOULDER	103.95	5.31	3915.00	3870.00	
TOTAL SHLD REFL	75.18	16.34	3909.00	3863.00	
TOTAL SHLD REEL	143.98	-2.63	3913.00	4014.00	
TOTAL SHOULDER	218.04	18.22	3913.00	4009.00	
TOTAL SHD / WT	1.33	0.11	3913.00	4009.00	
LF LAP BELT	52.35	24.96	3963.00	3864.00	8
RT LAP BELT	58.29	25.13	3932.00	3870.00	9
TOTAL LAP	108.63	50.57	3939.00	3864.00	
TOTAL LAP / WT	0.66	0.31	3939.00	3864.00	
CROTCH STRAP	74.67	-28.60	4098.00	3883.00	10
LF SEAT LNK X	13.48	-191.62	4110.00	3875.00	18
RT SEAT LNK X	21.46	-80.00	3924.00	3876.00	19
TOTAL SEAT X	13.88	-271.00	4109.00	3875.00	
SEAT LNK Y	56.53	-96.61	4089.00	3887.00	35
LF SEAT PAN Z	709.99	69.94	3889.00	3604.00	11
RT SEAT PAN Z	707.26	40.62	3888.00	3600.00	12
CT SEAT PAN Z	524.68	47.17	3877.00	3605.00	13
TOTAL SEAT Z	1911.88	173.51	3887.00	3600.00	
TOTAL SEAT Z / WT	11.66	1.06	3887.00	3600.00	
RES SEAT FORCE	1928.46	174.67	3887.00	3600.00	
RES SEAT FORCE / WT	11.76	1.07	3887.00	3600.00	
LF FOOT X	20.70	-80.56	3826.00	3889.00	20
RT FOOT X	53.08	-50.90	3868.00	3898.00	23
CT FOOT X	32.61	-153.43	3826.00	3889.00	26
TOTAL FOOT X	71.15	-282.17	3826.00	3899.00	
LF FOOT Y	98.00	-9.43	3863.00	4001.00	21
RT FOOT Y	19.01	-77.72	3914.00	3863.00	24
CT FOOT Y	25.20	-58.45	3991.00	3882.00	27
TOTAL FOOT Y	51.79	-54.54	3845.00	3882.00	
LF FOOT Z	160.23	-40.52	3890.00	3819.00	22
RT FOOT Z	164.13	-18.83	3888.00	3985.00	25
CT FOOT Z	185.81	-60.10	3870.00	3818.00	28
TOTAL FOOT Z	398.78	-91.59	3890.00	3819.00	
RES FOOT FORCE	480.27	9.02	3890.00	3952.00	

NEG SHLD HAR ANG TEST: 488 SUBJ: G-2 WT: 117.0 G: 10 GP: 1 CELL: J

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	484.00	29.00	48
CARRIAGE X	1.30	-1.12	3902.00	3909.00	36
CARRIAGE Y	0.75	-0.48	3854.00	3885.00	31
CARRIAGE Z	12.37	-0.22	3895.00	3606.00	1
CARRIAGE Z (SM)	10.45	-0.09	3910.00	3605.00	
CARRIAGE VEL	-0.92	-26.19	4190.00	3861.00	29
SEAT X	1.05	-1.35	3862.00	3908.00	32
SEAT Y	0.69	-0.78	3947.00	3893.00	33
SEAT Z	12.20	-0.20	3901.00	3639.00	34
SEAT Z (SM)	10.70	-0.11	3902.00	3717.00	
CHEST X	1.56	-2.69	3939.00	3959.00	5
CHEST Y	0.13	-2.30	3971.00	3950.00	6
CHEST Z	14.78	-1.10	3945.00	3826.00	7
CHEST RES	14.87	1.04	3945.00	3613.00	
CHEST SI	28.26		3861.00	4113.00	
HEAD X	1.12	-3.09	3912.00	3960.00	2
HEAD Y	2.07	0.60	3971.00	3921.00	3
HEAD Z	13.06	-1.08	3924.00	3726.00	4
HEAD RES	13.08	1.12	3924.00	3843.00	
HEAD SI	20.99		3867.00	3994.00	
HEAD HIC	17.22		3896.00	3959.00	
SHD REFL LF	22.09	6.41	3921.00	4055.00	14
SHD REEL LF	26.83	3.28	3954.00	3929.00	16
LF SHOULDER	44.04	10.77	3948.00	4055.00	
SHD REFL RT	22.62	8.76	3993.00	4048.00	15
SHD REEL RT	24.41	1.82	3956.00	3912.00	17
RT SHOULDER	45.74	11.07	4005.00	4059.00	
TOTAL SHLD REFL	43.15	15.60	3920.00	4047.00	
TOTAL SHLD REEL	50.89	6.66	3954.00	4067.00	
TOTAL SHOULDER	87.54	23.15	3954.00	4049.00	
TOTAL SHD / WT	0.75	0.20	3954.00	4049.00	
LF LAP BELT	20.40	3.96	4010.00	3903.00	8
RT LAP BELT	35.14	6.06	3983.00	3898.00	9
TOTAL LAP	53.71	12.12	3985.00	3903.00	
TOTAL LAP / WT	0.46	0.10	3985.00	3903.00	
CROTCH STRAP	95.27	-17.50	4000.00	3928.00	10
LF SEAT LNK X	34.96	-149.40	3769.00	3926.00	18
RT SEAT LNK X	48.11	-32.44	3828.00	3934.00	19
TOTAL SEAT X	80.19	-175.51	3828.00	3934.00	
SEAT LNK Y	24.26	-99.71	3790.00	3940.00	35
LF SEAT PAN Z	489.89	38.17	3918.00	4165.00	11
RT SEAT PAN Z	507.90	59.88	3919.00	4185.00	12
CT SEAT PAN Z	320.84	3.34	3925.00	3641.00	13
TOTAL SEAT Z	1289.71	158.52	3920.00	3641.00	
TOTAL SEAT Z / WT	11.02	1.35	3920.00	3641.00	
RES SEAT FORCE	1302.46	167.44	3919.00	4195.00	
RES SEAT FORCE / WT	11.13	1.43	3919.00	4195.00	
LF FOOT X	24.81	-42.10	3927.00	3896.00	20
RT FOOT X	27.30	-55.53	3902.00	3933.00	23
CT FOOT X	-1.54	-167.01	3864.00	3897.00	26
TOTAL FOOT X	27.43	-261.08	3864.00	3896.00	
LF FOOT Y	101.27	-14.90	3898.00	3967.00	21
RT FOOT Y	22.35	-136.50	3863.00	3897.00	24
CT FOOT Y	42.63	-33.02	3887.00	3910.00	27
TOTAL FOOT Y	67.91	-73.45	3940.00	3908.00	
LF FOOT Z	167.70	-20.74	3888.00	3893.00	22
RT FOOT Z	161.22	-3.07	3897.00	3929.00	25
CT FOOT Z	111.21	-110.43	3903.00	3872.00	28
TOTAL FOOT Z	345.49	-84.06	3899.00	3854.00	
RES FOOT FORCE	404.40	35.82	3898.00	4193.00	

NEG SHLD HAR ANG TEST: 491 SUBJ: H-3 WT: 188.[illegible] G: 10 GP: 1 CELL

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	388.00	2677.00	48
CARRIAGE X	1.15	-1.19	3909.00	3901.00	36
CARRIAGE Y	0.71	-0.56	3910.00	4018.00	31
CARRIAGE Z	12.60	-0.23	3901.00	3812.00	1
CARRIAGE Z (SM)	10.58	-0.11	3902.00	3705.00	
CARRIAGE VEL	-1.00	-26.08	4175.00	3853.00	29
SEAT X	1.39	-1.24	3910.00	3914.00	32
SEAT Y	0.72	-0.92	4016.00	3918.00	33
SEAT Z	11.66	-0.14	3907.00	3714.00	34
SEAT Z (SM)	10.65	-0.09	3909.00	3714.00	
CHEST X	2.29	-3.02	3918.00	3972.00	5
CHEST Y	1.07	-1.54	3980.00	3962.00	6
CHEST Z	17.89	-0.81	3931.00	3619.00	7
CHEST RES	18.03	0.81	3931.00	4163.00	
CHEST SI	32.03		3865.00	4073.00	
HEAD X	2.78	-2.93	3916.00	3969.00	2
HEAD Y	2.55	0.26	4033.00	3938.00	3
HEAD Z	10.81	-1.09	3921.00	3732.00	4
HEAD RES	11.17	0.89	3921.00	4128.00	
HEAD SI	19.88		3873.00	4059.00	
HEAD HIC	16.83		3894.00	3967.00	
SHD REFL LF	44.20	3.45	3984.00	3913.00	14
SHD REEL LF	54.70	7.03	3958.00	3919.00	16
LF SHOULDER	85.04	10.56	3959.00	3913.00	
SHD REFL RT	48.53	13.41	3985.00	3907.00	15
SHD REEL RT	69.94	2.53	3958.00	4043.00	17
RT SHOULDER	110.97	22.22	3961.00	3907.00	
TOTAL SHLD REFL	92.62	19.14	3985.00	3912.00	
TOTAL SHLD REEL	124.63	14.09	3958.00	4032.00	
TOTAL SHOULDER	195.26	34.37	3960.00	3913.00	
TOTAL SHD / WT	1.04	0.18	3960.00	3913.00	
LF LAP BELT	32.55	12.15	4087.00	3943.00	8
RT LAP BELT	55.19	22.42	4056.00	3939.00	9
TOTAL LAP	84.29	34.97	4056.00	3942.00	
TOTAL LAP / WT	0.45	0.19	4056.00	3942.00	
CROTCH STRAP	150.24	-11.47	3980.00	3935.00	10
LF SEAT LNK X	27.57	-173.50	4197.00	3916.00	18
RT SEAT LNK X	54.15	-72.52	3969.00	3923.00	19
TOTAL SEAT X	36.95	-239.68	4117.00	3923.00	
SEAT LNK Y	59.60	-18.79	4102.00	3913.00	35
LF SEAT PAN Z	356.76	34.66	3918.00	3653.00	11
RT SEAT PAN Z	560.77	48.04	3926.00	3607.00	12
CT SEAT PAN Z	842.86	74.91	3925.00	3622.00	13
TOTAL SEAT Z	1745.37	174.61	3926.00	3602.00	
TOTAL SEAT Z / WT	9.28	0.93	3926.00	3602.00	
RES SEAT FORCE	1760.87	175.00	3924.00	3602.00	
RES SEAT FORCE / WT	9.37	0.93	3924.00	3602.00	
LF FOOT X	19.08	-149.09	3869.00	3920.00	20
RT FOOT X	16.30	-95.61	3988.00	3938.00	23
CT FOOT X	-26.94	-276.48	3869.00	3921.00	26
TOTAL FOOT X	3.15	-518.52	3869.00	3920.00	
LF FOOT Y	153.78	-2.57	3904.00	3993.00	21
RT FOOT Y	35.25	-127.15	3959.00	3913.00	24
CT FOOT Y	6.76	-67.10	3942.00	3918.00	27
TOTAL FOOT Y	82.73	-52.52	3942.00	3917.00	
LF FOOT Z	214.91	-1.52	3904.00	3860.00	22
RT FOOT Z	234.76	27.67	3922.00	3855.00	25
CT FOOT Z	197.88	-101.71	3925.00	3881.00	28
TOTAL FOOT Z	573.06	-35.27	3922.00	3859.00	
RES FOOT FORCE	748.54	100.73	3922.00	3809.00	

NEG SHLD HAR ANG TEST: 493 SUBJ: H-4 WT: 185.0 G: 10 GP: 2 CELL: [illegible]

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	1008.00	214.00	48
CARRIAGE X	1.28	-1.20	3909.00	3915.00	36
CARRIAGE Y	0.75	-0.53	3875.00	3865.00	31
CARRIAGE Z	12.41	-0.25	3916.00	3842.00	[illegible]
CARRIAGE Z (SM)	10.47	-0.09	3917.00	3840.00	
CARRIAGE VEL	-1.22	-26.09	4167.00	3875.00	29
SEAT X	1.07	-1.46	3926.00	3930.00	32
SEAT Y	0.75	-1.00	4012.00	3927.00	33
SEAT Z	11.40	-0.19	3923.00	3780.00	34
SEAT Z (SM)	10.54	-0.08	3924.00	3755.00	
CHEST X	1.15	-4.41	3923.00	3982.00	5
CHEST Y	-0.37	-3.31	4023.00	3947.00	6
CHEST Z	16.07	-0.73	3945.00	3678.00	7
CHEST RES	16.42	1.09	3945.00	3793.00	
CHEST SI	29.88		3883.00	4019.00	
HEAD X	5.30	-2.13	3940.00	3985.00	2
HEAD Y	0.87	-0.34	4078.00	3954.00	3
HEAD Z	13.11	-1.18	3942.00	3815.00	4
HEAD RES	14.00	0.37	3942.00	4005.00	
HEAD SI	22.97		3891.00	4000.00	
HEAD HIC	19.46		3921.00	3979.00	
SHD REFL LF	36.87	5.13	3978.00	3934.00	14
SHD REEL LF	82.02	1.64	3981.00	3944.00	16
LF SHOULDER	118.68	8.41	3980.00	3934.00	
SHD REFL RT	41.47	4.14	3996.00	3933.00	15
SHD REEL RT	79.21	0.25	3982.00	4012.00	17
RT SHOULDER	118.49	6.42	3982.00	3930.00	
TOTAL SHLD REFL	77.13	9.46	3991.00	3933.00	
TOTAL SHLD REEL	160.41	5.35	3982.00	3927.00	
TOTAL SHOULDER	236.08	15.66	3981.00	3933.00	
TOTAL SHD / WT	1.28	0.08	3981.00	3933.00	
LF LAP BELT	74.22	47.38	3974.00	4100.00	8
RT LAP BELT	78.39	48.33	3970.00	3916.00	9
TOTAL LAP	151.07	98.67	3972.00	3917.00	
TOTAL LAP / WT	0.82	0.53	3972.00	3917.00	
CROTCH STRAP	114.29	-100.94	4055.00	3942.00	10
LF SEAT LNK X	19.07	-130.72	3612.00	3931.00	18
RT SEAT LNK X	1.82	-178.95	3698.00	3938.00	19
TOTAL SEAT X	11.67	-304.84	3698.00	3932.00	
SEAT LNK Y	44.74	-70.72	4157.00	3954.00	35
LF SEAT PAN Z	662.96	100.04	3942.00	3612.00	11
RT SEAT PAN Z	974.99	104.50	3940.00	3634.00	12
CT SEAT PAN Z	390.68	34.71	3942.00	3626.00	13
TOTAL SEAT Z	2024.12	249.23	3942.00	3626.00	
TOTAL SEAT Z / WT	10.94	1.35	3942.00	3626.00	
RES SEAT FORCE	2046.64	249.63	3942.00	3626.00	
RES SEAT FORCE / WT	11.06	1.35	3942.00	3626.00	
LF FOOT X	-15.10	-148.91	3626.00	3934.00	20
RT FOOT X	32.41	-53.95	3886.00	3944.00	23
CT FOOT X	-26.01	-178.06	3886.00	3930.00	26
TOTAL FOOT X	-33.11	-368.57	3886.00	3934.00	
LF FOOT Y	131.32	-9.31	3918.00	3894.00	21
RT FOOT Y	17.15	-121.29	4083.00	3918.00	24
CT FOOT Y	40.81	-36.61	3886.00	3993.00	27
TOTAL FOOT Y	67.36	-55.41	3956.00	4009.00	
LF FOOT Z	231.49	10.03	3943.00	4009.00	22
RT FOOT Z	160.17	-18.11	3928.00	3973.00	25
CT FOOT Z	188.04	-94.37	3940.00	3896.00	28
TOTAL FOOT Z	459.16	-61.02	3940.00	3876.00	
RES FOOT FORCE	552.82	77.65	3943.00	4017.00	

NEG SHLD HAR ANG TEST: 482 SUBJ: K-1 WT: 183.0 G: 10 GP: 1 CELL: J

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	66.00	666.00	48
CARRIAGE X	1.66	-1.17	3816.00	3779.00	36
CARRIAGE Y	0.63	-1.00	3945.00	3949.00	31
CARRIAGE Z	12.16	-0.35	3822.00	3727.00	1
CARRIAGE Z (SM)	10.19	-0.11	3823.00	3622.00	
CARRIAGE VEL	-0.99	-26.19	4193.00	3785.00	29
SEAT X	2.04	-1.57	3793.00	3835.00	32
SEAT Y	1.30	-2.58	3788.00	3795.00	33
SEAT Z	10.68	-0.19	3819.00	3631.00	34
SEAT Z (SM)	10.02	-0.12	3829.00	3632.00	
CHEST X	5.89	-1.16	3843.00	3887.00	5
CHEST Y	0.25	-2.05	3835.00	3862.00	6
CHEST Z	16.05	-0.67	3856.00	3637.00	7
CHEST RES	16.54	0.66	3856.00	4066.00	
CHEST SI	31.34		3789.00	3902.00	
HEAD X	1.51	-4.35	3837.00	3881.00	2
HEAD Y	2.17	0.20	3892.00	3850.00	3
HEAD Z	12.70	-1.16	3847.00	3646.00	4
HEAD RES	12.75	1.29	3847.00	4126.00	
HEAD SI	20.12		3797.00	3926.00	
HEAD HIC	16.42		3821.00	3885.00	
SHD REFL LF	23.12	-0.68	3927.00	3839.00	14
SHD REEL LF	18.93	2.29	3919.00	3991.00	16
LF SHOULDER	39.61	3.96	3927.00	3838.00	
SHD REFL RT	28.07	5.89	3919.00	3824.00	15
SHD REEL RT	31.54	-0.66	3883.00	3855.00	17
RT SHOULDER	57.22	6.30	3883.00	3832.00	
TOTAL SHLD REFL	51.57	6.15	3927.00	3833.00	
TOTAL SHLD REEL	42.42	4.80	3883.00	3991.00	
TOTAL SHOULDER	82.01	11.54	3928.00	3833.00	
TOTAL SHD / WT	0.45	0.06	3928.00	3833.00	
LF LAP BELT	48.83	20.57	3876.00	3958.00	8
RT LAP BELT	43.51	15.67	3905.00	3971.00	9
TOTAL LAP	80.49	37.76	3904.00	3959.00	
TOTAL LAP / WT	0.49	0.21	3904.00	3959.00	
CROTCH STRAP	112.29	-50.61	3930.00	3849.00	10
LF SEAT LNK X	28.51	-179.48	4076.00	3844.00	18
RT SEAT LNK X	8.93	-160.77	3686.00	3845.00	19
TOTAL SEAT X	12.70	-338.51	4075.00	3845.00	
SEAT LNK Y	37.40	-130.93	3920.00	3836.00	35
LF SEAT PAN Z	792.76	71.10	3845.00	4088.00	11
RT SEAT PAN Z	814.82	49.41	3848.00	3618.00	12
CT SEAT PAN Z	614.48	20.76	3847.00	3606.00	13
TOTAL SEAT Z	2207.06	166.16	3847.00	3618.00	
TOTAL SEAT Z / WT	12.06	0.91	3847.00	3618.00	
RES SEAT FORCE	2236.08	166.29	3847.00	3618.00	
RES SEAT FORCE / WT	12.22	0.91	3847.00	3618.00	
LF FOOT X	37.14	-77.68	3790.00	3835.00	20
RT FOOT X	42.23	-35.32	3791.00	3835.00	23
CT FOOT X	27.17	-150.82	3791.00	3835.00	26
TOTAL FOOT X	103.00	-263.82	3790.00	3835.00	
LF FOOT Y	108.80	-6.50	3824.00	4082.00	21
RT FOOT Y	16.76	-70.67	3788.00	3823.00	24
CT FOOT Y	12.99	-38.62	3894.00	3852.00	27
TOTAL FOOT Y	47.87	-49.10	3826.00	3853.00	
LF FOOT Z	140.96	-48.67	3825.00	3803.00	22
RT FOOT Z	136.29	-15.46	3845.00	4090.00	25
CT FOOT Z	178.53	-68.86	3790.00	3784.00	28
TOTAL FOOT Z	384.92	-117.91	3845.00	3784.00	
RES FOOT FORCE	402.91	17.29	3845.00	4173.00	

AD-A113 957 AIR FORCE AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATT--ETC F/G 1/3
COMPARATIVE VERTICAL IMPACT TESTING OF THE F/FB-111 CREW RESTRA--ETC(U)
MAR 82 B F HEARON, J W BRINKLEY, J H RADDIN
UNCLASSIFIED AFAMRL-TR-82-13 NL

3 OF 4
AD A
113957

NEG SHLD HAR HNG   TEST: 484   SUBJ: M-2   WT: 162.0   G: 10   GP: 1   CELL: J

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	155.00	882.00	48
CARRIAGE X	1.03	-1.16	3886.00	3875.00	36
CARRIAGE Y	0.80	-0.60	3866.00	3970.00	31
CARRIAGE Z	11.98	-0.22	3876.00	3686.00	1
CARRIAGE Z (SM)	10.43	-0.08	3893.00	3667.00	
CARRIAGE VEL	-0.93	-26.11	4170.00	3835.00	29
SEAT X	1.49	-1.44	3886.00	3890.00	32
SEAT Y	0.75	-0.95	3857.00	3845.00	33
SEAT Z	11.97	-0.21	3882.00	3699.00	34
SEAT Z (SM)	10.71	-0.09	3883.00	3698.00	
CHEST X	1.32	-3.72	3891.00	3937.00	5
CHEST Y	-0.07	-1.15	3890.00	3865.00	6
CHEST Z	19.72	-0.70	3904.00	3791.00	7
CHEST RES	19.84	0.56	3904.00	3832.00	
CHEST SI	37.29		3841.00	3953.00	
HEAD X	1.57	-5.26	3884.00	3943.00	2
HEAD Y	2.81	-0.07	3980.00	3920.00	3
HEAD Z	10.90	-1.32	3900.00	3695.00	4
HEAD RES	10.95	1.56	3900.00	3844.00	
HEAD SI	15.78		3857.00	3991.00	
HEAD HIC	12.63		3870.00	3960.00	
SHD REFL LF	35.59	4.48	3968.00	3886.00	14
SHD REEL LF	47.85	1.66	3943.00	3884.00	16
LF SHOULDER	79.78	6.16	3944.00	3885.00	
SHD REFL RT	31.14	7.03	3950.00	3879.00	15
SHD REEL RT	49.34	-1.52	3975.00	4016.00	17
RT SHOULDER	76.67	7.88	3933.00	3892.00	
TOTAL SHLD REFL	62.14	12.22	3949.00	3867.00	
TOTAL SHLD REEL	91.14	2.88	3938.00	3886.00	
TOTAL SHOULDER	145.14	15.12	3941.00	3886.00	
TOTAL SHD / WT	0.90	0.09	3941.00	3886.00	
LF LAP BELT	41.61	13.81	3964.00	3884.00	8
RT LAP BELT	63.43	21.70	3959.00	3886.00	9
TOTAL LAP	102.44	35.81	3965.00	3885.00	
TOTAL LAP / WT	0.63	0.22	3965.00	3885.00	
CROTCH STRAP	67.82	-29.85	3979.00	3900.00	10
LF SEAT LNK X	26.29	-154.03	4103.00	3892.00	18
RT SEAT LNK X	12.40	-125.95	3828.00	3897.00	19
TOTAL SEAT X	20.59	-276.41	3629.00	3898.00	
SEAT LNK Y	58.21	-71.83	3977.00	3893.00	35
LF SEAT PAN Z	515.01	63.07	3900.00	3603.00	11
RT SEAT PAN Z	550.09	51.95	3899.00	3628.00	12
CT SEAT PAN Z	792.72	49.34	3901.00	3622.00	13
TOTAL SEAT Z	1848.46	180.55	3901.00	3628.00	
TOTAL SEAT Z / WT	11.41	1.11	3901.00	3628.00	
RES SEAT FORCE	1868.93	181.17	3901.00	3628.00	
RES SEAT FORCE / WT	11.54	1.12	3901.00	3628.00	
LF FOOT X	14.05	-59.18	3884.00	3897.00	20
RT FOOT X	14.79	-89.19	4044.00	3896.00	23
CT FOOT X	-12.74	-188.94	3841.00	3896.00	26
TOTAL FOOT X	5.48	-333.70	3841.00	3896.00	
LF FOOT Y	99.26	-10.80	3878.00	3844.00	21
RT FOOT Y	22.29	-106.39	3931.00	3879.00	24
CT FOOT Y	20.49	-32.91	3838.00	3867.00	27
TOTAL FOOT Y	35.19	-67.96	3839.00	3869.00	
LF FOOT Z	171.83	-16.27	3888.00	3958.00	22
RT FOOT Z	183.74	0.38	3881.00	3650.00	25
CT FOOT Z	196.86	-79.64	3884.00	3832.00	28
TOTAL FOOT Z	475.95	-70.00	3881.00	3832.00	
RES FOOT FORCE	507.65	44.20	3881.00	4192.00	

NEG SHLD HAR ANG TEST: 523 SUBJ: M10 WT: 144.0 G: 10 GP: 1 CELL: J

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	231.00	423.00	49
CARRIAGE X	1.20	-0.92	3928.00	3913.00	36
CARRIAGE Y	0.69	-0.80	3930.00	4014.00	31
CARRIAGE Z	11.79	-0.25	3921.00	3659.00	1
CARRIAGE Z (SM)	10.70	-0.06	3921.00	3684.00	
CARRIAGE VEL	-1.07	-25.18	4175.00	3837.00	23
SEAT X	1.13	-0.95	3929.00	3935.00	32
SEAT Y	0.69	-1.04	3885.00	3891.00	33
SEAT Z	11.29	-0.23	3927.00	3744.00	34
SEAT Z (SM)	10.93	-0.13	3927.00	3651.00	
CHEST X	1.80	-1.97	3932.00	3970.00	5
CHEST Y	1.28	-1.43	3941.00	4074.00	6
CHEST Z	15.97	-0.94	3948.00	3780.00	7
CHEST RES	16.02	0.85	3948.00	3875.00	
CHEST SI	29.58		3881.00	3992.00	
HEAD X	.81	-3.29	3946.00	3973.00	2
HEAD Y	1.57	-0.93	4179.00	4129.00	3
HEAD Z	14.05	-0.87	3937.00	3638.00	4
HEAD RES	14.07	0.40	3938.00	4141.00	
HEAD SI	21.49		3891.00	4067.00	
HEAD HIC	16.33		3916.00	3969.00	
SHD REFL LF	20.25	3.81	3988.00	4095.00	14
SHD REEL LF	34.39	-4.47	4009.00	3937.00	16
LF SHOULDER	53.94	3.21	4008.00	3937.00	
SHD REFL RT	27.62	6.88	4013.00	3927.00	15
SHD REEL RT	43.10	4.49	3992.00	3934.00	17
RT SHOULDER	65.85	12.08	3992.00	3926.00	
TOTAL SHLD REFL	45.57	12.53	4007.00	3925.00	
TOTAL SHLD REEL	63.10	1.61	3991.00	3935.00	
TOTAL SHOULDER	106.47	20.17	4007.00	3936.00	
TOTAL SHD / WT	0.74	0.14	4007.00	3936.00	
LF LAP BELT	41.71	12.07	4006.00	3928.00	8
RT LAP BELT	41.56	12.58	4018.00	3923.00	9
TOTAL LAP	81.63	28.66	4016.00	3923.00	
TOTAL LAP / WT	0.57	0.20	4016.00	3923.00	
CROTCH STRAP	66.04	-43.83	4014.00	3954.00	10
LF SEAT LNK X	38.61	-223.53	3726.00	3935.00	18
RT SEAT LNK X	6.57	-77.06	3881.00	3941.00	19
TOTAL SEAT X	37.88	-298.85	3637.00	3941.00	
SEAT LNK Y	26.46	-132.75	3634.00	3938.00	35
LF SEAT PAN Z	528.00	37.40	3936.00	3726.00	11
RT SEAT PAN Z	456.23	23.90	3935.00	3754.00	12
CT SEAT PAN Z	698.57	27.45	3943.00	3616.00	13
TOTAL SEAT Z	1658.54	104.35	3939.00	3660.00	
TOTAL SEAT Z / WT	11.52	0.72	3939.00	3660.00	
RES SEAT FORCE	1689.75	110.87	3939.00	3660.00	
RES SEAT FORCE / WT	11.73	0.77	3939.00	3660.00	
LF FOOT X	10.07	-75.82	3991.00	3934.00	20
RT FOOT X	17.18	-53.31	4123.00	3941.00	23
CT FOOT X	-11.66	-167.29	3886.00	3934.00	26
TOTAL FOOT X	0.54	-286.73	3885.00	3934.00	
LF FOOT Y	95.51	-9.31	3924.00	3775.00	21
RT FOOT Y	20.14	-117.41	3897.00	3925.00	24
CT FOOT Y	31.26	-33.71	3882.00	3930.00	27
TOTAL FOOT Y	65.34	-54.77	3899.00	3891.00	
LF FOOT Z	178.78	-5.75	3926.00	3891.00	22
RT FOOT Z	179.82	-21.66	3925.00	4000.00	25
CT FOOT Z	205.81	-62.30	3929.00	4000.00	28
TOTAL FOOT Z	510.26	-49.34	3926.00	4000.00	
RES FOOT FORCE	540.97	32.30	3926.00	4008.00	

NEG SHLD HAR ANG TEST: 487 SUBJ: M11 WT: 157.0 G: 10 GP: 1 CELL: [illegible]

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	68.00	141.00	48
CARRIAGE X	1.46	-1.20	3877.00	[illegible]	36
CARRIAGE Y	1.31	-0.92	3844.00	[illegible]	31
CARRIAGE Z	12.05	-0.47	3882.00	[illegible]	1
CARRIAGE Z (SM)	10.17	-0.18	3897.00	3805.00	
CARRIAGE VEL	-1.15	-26.07	4135.00	[illegible]	29
SEAT X	1.76	-1.42	3854.00	3864.00	32
SEAT Y	1.42	-2.02	3850.00	3855.00	33
SEAT Z	11.19	-0.24	3881.00	3814.00	34
SEAT Z (SM)	10.19	-0.05	3890.00	3720.00	
CHEST X	3.19	-2.28	3903.00	3937.00	5
CHEST Y	0.13	-1.56	3942.00	[illegible]	6
CHEST Z	18.15	-0.64	3906.00	3708.00	7
CHEST RES	16.48	0.48	3906.00	3764.00	
CHEST SI	32.27		3845.00	4095.00	
HEAD X	2.35	-3.40	3902.00	3938.00	2
HEAD Y	2.00	0.06	4039.00	3913.00	3
HEAD Z	12.72	-1.07	3907.00	3825.00	4
HEAD RES	12.64	0.93	3907.00	3675.00	
HEAD SI	21.45		3855.00	4049.00	
HEAD HIC	17.08		3873.00	[illegible]	
SHD REFL LF	32.09	8.40	3938.00	[illegible]	14
SHD REEL LF	48.81	5.55	3937.00	3894.00	16
LF SHOULDER	80.89	14.83	3938.00	3893.00	
SHD REFL RT	43.02	9.76	4078.00	3887.00	15
SHD REEL RT	43.93	0.29	3935.00	3894.00	17
RT SHOULDER	73.99	11.32	3935.00	3894.00	
TOTAL SHLD REFL	84.32	18.97	3947.00	3890.00	
TOTAL SHLD REEL	92.11	5.84	3936.00	3894.00	
TOTAL SHOULDER	153.60	26.22	3937.00	3894.00	
TOTAL SHD / WT	0.98	0.17	3937.00	3894.00	
LF LAP BELT	40.90	15.17	3978.00	3884.00	8
RT LAP BELT	44.16	11.76	3974.00	3891.00	9
TOTAL LAP	83.99	27.50	3975.00	3892.00	
TOTAL LAP / WT	0.53	0.18	3975.00	3892.00	
CROTCH STRAP	126.03	-16.54	4098.00	3898.00	10
LF SEAT LNK X	25.68	-191.52	3611.00	3900.00	18
RT SEAT LNK X	10.10	-85.82	3948.00	3898.00	19
TOTAL SEAT X	27.64	-275.57	3636.00	3899.00	
SEAT LNK Y	52.53	-96.96	4161.00	3905.00	35
LF SEAT PAN Z	639.46	48.22	3907.00	3604.00	11
RT SEAT PAN Z	617.19	44.01	3910.00	3603.00	12
CT SEAT PAN Z	590.36	39.05	3907.00	3603.00	13
TOTAL SEAT Z	1843.98	144.24	3907.00	3615.00	
TOTAL SEAT Z / WT	11.75	0.92	3907.00	3615.00	
RES SEAT FORCE	1865.45	146.84	3907.00	3615.00	
RES SEAT FORCE / WT	11.88	0.94	3907.00	3615.00	
LF FOOT X	30.13	-75.86	3852.00	3910.00	20
RT FOOT X	49.65	-48.16	3878.00	3911.00	23
CT FOOT X	51.75	-156.65	3852.00	3911.00	26
TOTAL FOOT X	128.00	-275.05	3852.00	3911.00	
LF FOOT Y	90.23	-17.21	3901.00	3974.00	21
RT FOOT Y	20.82	-92.77	3933.00	3901.00	24
CT FOOT Y	25.35	-41.40	3873.00	3912.00	27
TOTAL FOOT Y	66.08	-52.07	3873.00	3961.00	
LF FOOT Z	144.50	-52.00	3887.00	3960.00	22
RT FOOT Z	143.84	-28.57	3910.00	3862.00	25
CT FOOT Z	190.04	-96.97	3906.00	3845.00	28
TOTAL FOOT Z	375.90	-155.76	3908.00	3845.00	
RES FOOT FORCE	440.20	11.08	3910.00	3985.00	

NEG SHLD HAR ANG TEST: 480 SUBJ: M13 WT: 170.0 G: 10 GP: 1 CELL: J

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	572.00	2076.00	48
CARRIAGE X	1.25	-1.19	3815.00	3829.00	36
CARRIAGE Y	1.19	-1.16	3807.00	3803.00	31
CARRIAGE Z	12.30	-0.24	3848.00	3762.00	1
CARRIAGE Z (SM)	10.51	-0.09	3849.00	3759.00	
CARRIAGE VEL	-0.92	-26.16	4180.00	3795.00	29
SEAT X	1.25	-1.24	3814.00	3826.00	32
SEAT Y	0.61	-1.02	3961.00	3863.00	33
SEAT Z	11.44	-0.25	3854.00	3606.00	34
SEAT Z (SM)	10.51	-0.14	3855.00	3605.00	
CHEST X	2.79	-3.00	3865.00	3904.00	5
CHEST Y	0.13	-3.21	3879.00	3863.00	6
CHEST Z	20.97	-0.98	3871.00	3700.00	7
CHEST RES	21.10	1.00	3871.00	3783.00	
CHEST SI	36.49		3813.00	3944.00	
HEAD X	3.36	-1.46	3867.00	3922.00	2
HEAD Y	2.30	0.79	3958.00	3895.00	3
HEAD Z	13.17	-1.47	3870.00	3963.00	4
HEAD RES	13.62	1.50	3868.00	3817.00	
HEAD SI	21.35		3823.00	3935.00	
HEAD HIC	17.48		3844.00	3907.00	
SHD REFL LF	40.21	8.61	3774.00	3851.00	14
SHD REEL LF	63.91	10.00	3898.00	3856.00	16
LF SHOULDER	99.97	19.52	3899.00	3858.00	
SHD REFL RT	25.86	8.70	3799.00	3853.00	15
SHD REEL RT	30.97	-1.48	3899.00	3863.00	17
RT SHOULDER	55.74	11.39	3799.00	3863.00	
O.TOTAL SHLD REFL	64.82				
O.TOTAL SHLD REEL	92.01				
TOTAL SHOULDER	152.83	31.30	3899.00	3858.00	
TOTAL SHD / WT	0.90	0.18	3899.00	3858.00	
LF LAP BELT	62.26	15.46	3719.00	3856.00	8
RT LAP BELT	61.07	19.74	3604.00	3864.00	9
TOTAL LAP	123.33	37.49	3719.00	3864.00	
TOTAL LAP / WT	0.73	0.22	3719.00	3864.00	
CROTCH STRAP	110.81	18.90	3789.00	3843.00	10
LF SEAT LNK X	20.53	-209.92	3785.00	3866.00	18
RT SEAT LNK X	4.59	-148.52	3624.00	3864.00	19
TOTAL SEAT X	11.29	-356.71	4155.00	3868.00	
SEAT LNK Y	31.83	-66.61	3927.00	3863.00	35
LF SEAT PAN Z	408.55	29.63	3874.00	3602.00	11
RT SEAT PAN Z	478.77	33.63	3868.00	3627.00	12
CT SEAT PAN Z	862.02	47.82	3870.00	3606.00	13
TOTAL SEAT Z	1730.94	131.39	3870.00	3606.00	
TOTAL SEAT Z / WT	10.18	0.77	3870.00	3606.00	
RES SEAT FORCE	1768.31	131.61	3870.00	3606.00	
RES SEAT FORCE / WT	10.40	0.77	3870.00	3606.00	
LF FOOT X	-4.00	-145.04	3816.00	3866.00	20
RT FOOT X	29.80	-65.37	3815.00	3866.00	23
CT FOOT X	-21.59	-223.73	3816.00	3868.00	26
TOTAL FOOT X	-3.88	-432.35	3815.00	3866.00	
LF FOOT Y	141.80	-10.18	3850.00	4005.00	21
RT FOOT Y	16.01	-128.64	3904.00	3867.00	24
CT FOOT Y	18.05	-44.25	3819.00	3863.00	27
TOTAL FOOT Y	60.17	-43.73	3890.00	4022.00	
LF FOOT Z	226.90	22.49	3875.00	4007.00	22
RT FOOT Z	205.99	14.21	3868.00	4101.00	25
CT FOOT Z	131.97	-121.08	3859.00	3607.00	28
TOTAL FOOT Z	511.56	-28.90	3859.00	3787.00	
RES FOOT FORCE	639.47	89.11	3868.00	4101.00	

NEG SHLD HAR ANG TEST: 483 SUBJ: R-2 WT: 145.0 G: 10 GP: 1 CELL: J

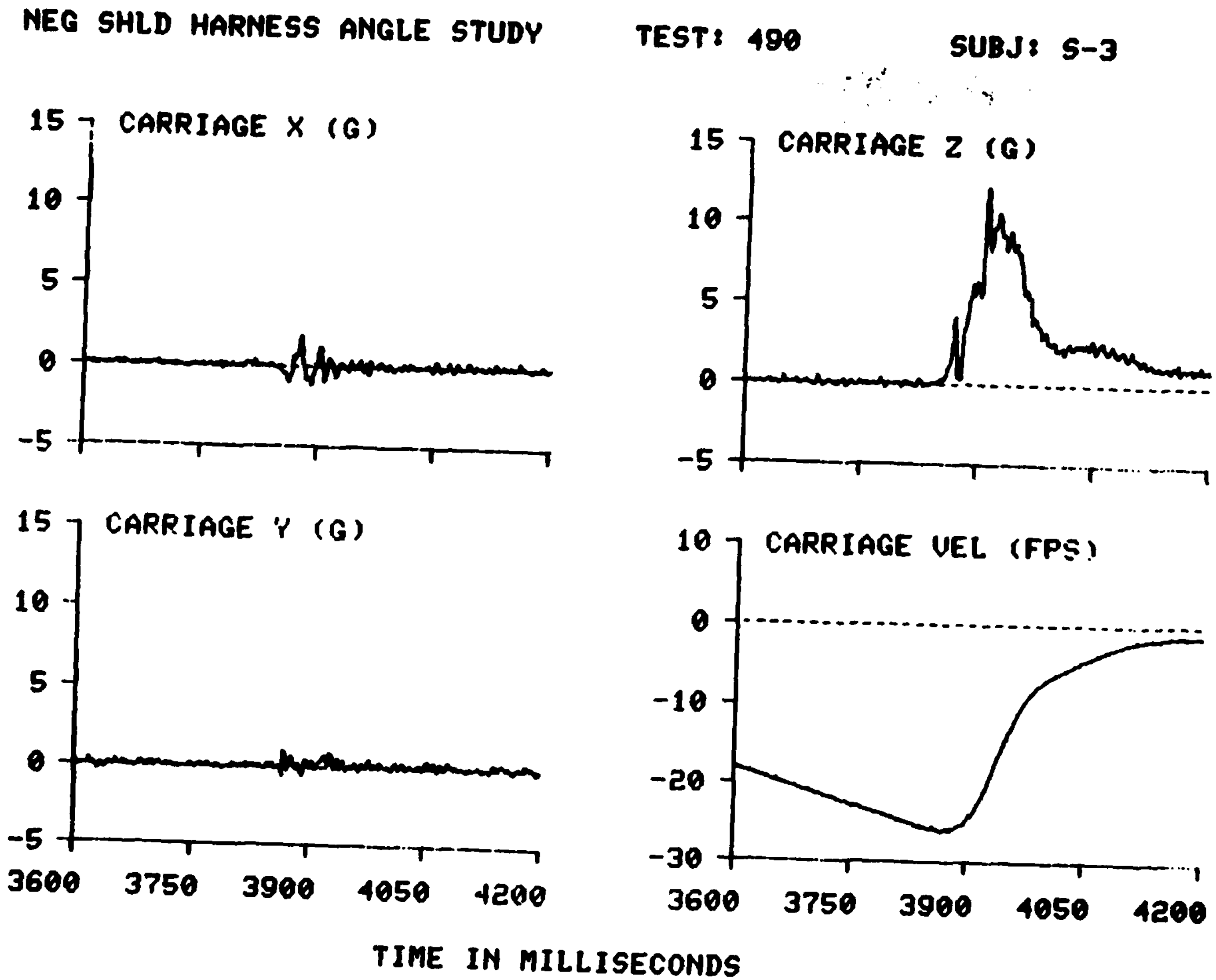
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	274.00	445.00	48
CARRIAGE X	1.38	-1.20	3887.00	3899.00	36
CARRIAGE Y	0.98	-0.89	3878.00	3873.00	31
CARRIAGE Z	12.25	-0.60	3918.00	3838.00	1
CARRIAGE Z (SM)	10.54	-0.24	3919.00	3840.00	
CARRIAGE VEL	-1.29	-26.19	4196.00	3881.00	29
SEAT X	3.23	-1.58	3884.00	3879.00	32
SEAT Y	1.05	-1.01	4090.00	3891.00	33
SEAT Z	11.51	-0.26	3924.00	3849.00	34
SEAT Z (SM)	10.54	-0.13	3926.00	3743.00	
CHEST X	3.79	-1.11	3941.00	3975.00	5
CHEST Y	-0.05	-1.88	3977.00	3887.00	6
CHEST Z	13.86	-0.92	3955.00	3758.00	7
CHEST RES	13.77	0.55	3955.00	3879.00	
CHEST SI	27.51		3883.00	4132.00	
HEAD X	.40	-4.33	3857.00	3965.00	2
HEAD Y	1.02	-0.20	3994.00	4121.00	3
HEAD Z	12.95	-0.64	3940.00	3758.00	4
HEAD RES	13.12	0.28	3943.00	3877.00	
HEAD SI	21.82		3889.00	4117.00	
HEAD HIC	17.33		3912.00	3975.00	
SHD REFL LF	24.69	4.36	3975.00	3919.00	14
SHD REEL LF	29.78	2.87	3983.00	3927.00	16
LF SHOULDER	52.34	9.15	3984.00	3918.00	
SHD REFL RT	39.41	10.83	4005.00	3918.00	15
SHD REEL RT	40.56	2.51	3969.00	3922.00	17
RT SHOULDER	69.27	14.63	3969.00	3919.00	
TOTAL SHLD REFL	62.56	15.25	3998.00	3919.00	
TOTAL SHLD REEL	60.69	5.54	3970.00	3927.00	
TOTAL SHOULDER	114.15	24.43	3984.00	3919.00	
TOTAL SHD / WT	0.79	0.17	3984.00	3919.00	
LF LAP BELT	28.99	4.69	3991.00	3937.00	8
RT LAP BELT	41.24	4.24	4011.00	3945.00	9
TOTAL LAP	68.54	10.11	4011.00	3932.00	
TOTAL LAP / WT	0.47	0.07	4011.00	3932.00	
CROTCH STRAP	87.53	2.63	4006.00	3935.00	10
LF SEAT LNK X	46.45	-179.39	4131.00	3938.00	18
RT SEAT LNK X	84.35	-34.64	3886.00	3939.00	19
TOTAL SEAT X	74.10	-211.58	4140.00	3938.00	
SEAT LNK Y	60.33	-45.40	4001.00	3932.00	35
LF SEAT PAN Z	411.53	20.43	3939.00	3717.00	11
RT SEAT PAN Z	353.95	7.53	3942.00	3616.00	12
CT SEAT PAN Z	852.08	73.33	3941.00	3605.00	13
TOTAL SEAT Z	1590.56	115.92	3943.00	3616.00	
TOTAL SEAT Z / WT	10.97	0.80	3943.00	3616.00	
RES SEAT FORCE	1602.13	120.14	3943.00	3616.00	
RES SEAT FORCE / WT	11.05	0.83	3943.00	3616.00	
LF FOOT X	23.85	-93.69	3887.00	3937.00	20
RT FOOT X	33.18	-49.65	3889.00	3936.00	23
CT FOOT X	30.93	-162.27	3889.00	3937.00	26
TOTAL FOOT X	75.50	-296.78	3888.00	3937.00	
LF FOOT Y	89.30	-7.65	3920.00	3890.00	21
RT FOOT Y	22.20	-88.73	3975.00	3937.00	24
CT FOOT Y	19.92	-46.83	3900.00	3951.00	27
TOTAL FOOT Y	44.50	-68.56	3884.00	3950.00	
LF FOOT Z	149.11	-39.52	3944.00	3879.00	22
RT FOOT Z	156.94	-27.84	3946.00	4028.00	25
CT FOOT Z	153.19	-86.76	3926.00	3879.00	28
TOTAL FOOT Z	355.16	-108.50	3946.00	3879.00	
RES FOOT FORCE	451.07	9.32	3946.00	4037.00	

NEG SHLD HAR ANG TEST: 518 SUBJ: R-3 WT: 148.0 G: 10 GP: 1 CELL: J

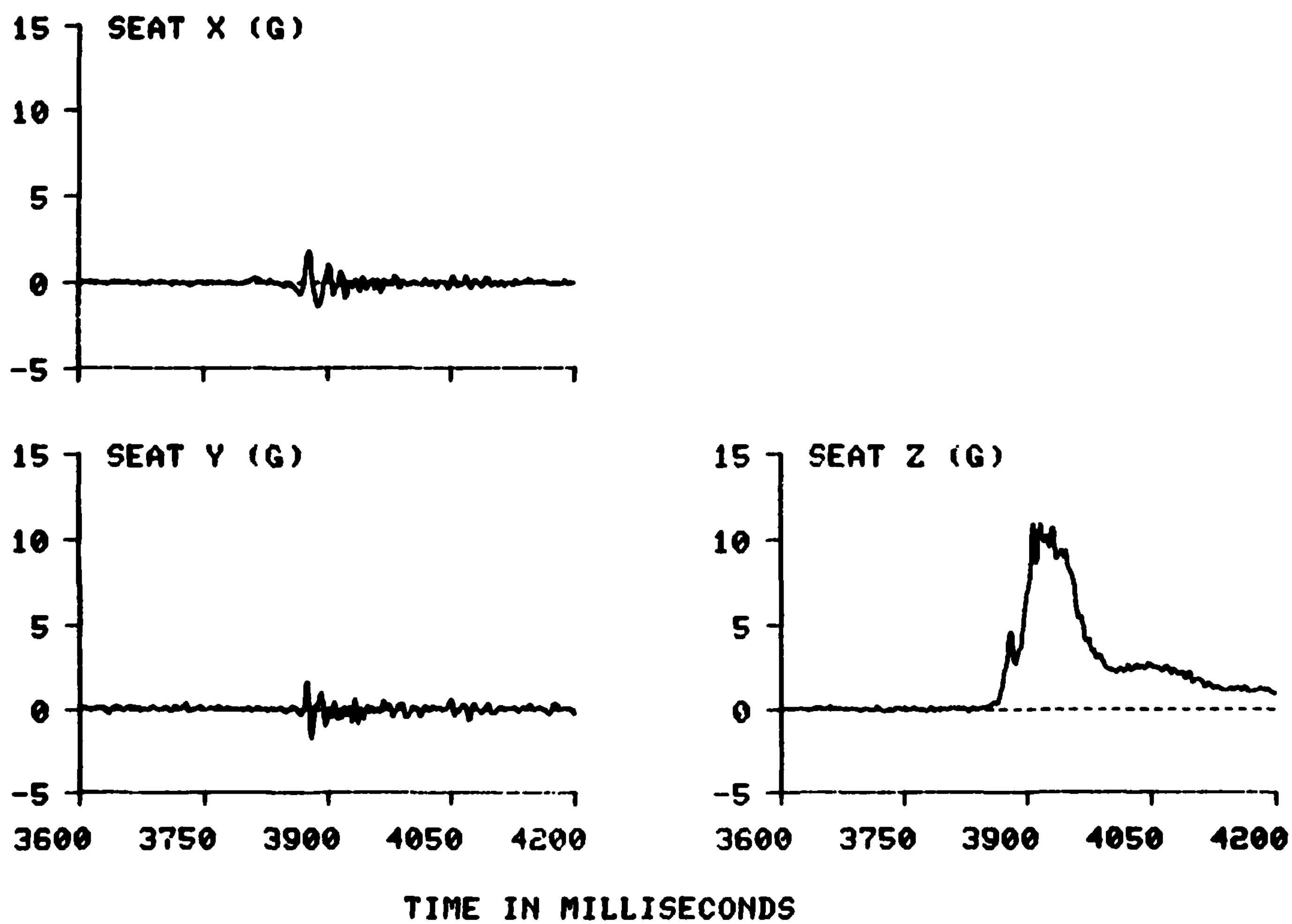
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	2161.00	16.00	48
CARRIAGE X	1.36	-1.93	3853.00	3861.00	36
CARRIAGE Y	0.57	-0.91	3896.00	3835.00	31
CARRIAGE Z	12.18	-0.38	3886.00	3782.00	1
CARRIAGE Z (SM)	11.11	-0.13	3886.00	3780.00	
CARRIAGE VEL	-0.99	-26.17	4162.00	3840.00	29
SEAT X	1.35	-1.96	3855.00	3861.00	32
SEAT Y	0.75	-0.89	3848.00	3919.00	33
SEAT Z	12.01	-0.23	3892.00	3790.00	34
SEAT Z (SM)	11.20	-0.14	3894.00	3708.00	
CHEST X	2.70	-2.11	3897.00	3948.00	5
CHEST Y	0.18	-2.98	3894.00	3909.00	6
CHEST Z	18.18	-1.09	3907.00	3690.00	7
CHEST RES	18.49	1.00	3908.00	4127.00	
CHEST SI	31.24		3847.00	3960.00	
HEAD X	2.26	-3.41	3904.00	3963.00	2
HEAD Y	2.49	0.68	3981.00	3929.00	3
HEAD Z	12.50	-1.28	3906.00	3724.00	4
HEAD RES	12.73	1.47	3904.00	4197.00	
HEAD SI	18.18		3859.00	3995.00	
HEAD HIC	13.58		3881.00	3942.00	
SHD REFL LF	33.37	8.21	3975.00	3893.00	14
SHD REEL LF	51.27	2.72	3952.00	3914.00	16
LF SHOULDER	81.81	12.96	3952.00	3904.00	
SHD REFL RT	22.69	7.47	3977.00	3886.00	15
SHD REEL RT	45.05	2.35	3955.00	3893.00	17
RT SHOULDER	66.40	12.02	3955.00	3912.00	
TOTAL SHLD REFL	55.91	17.47	3977.00	3893.00	
TOTAL SHLD REEL	94.97	6.59	3953.00	3913.00	
TOTAL SHOULDER	146.42	25.57	3953.00	3905.00	
TOTAL SHD / WT	0.99	0.17	3953.00	3905.00	
LF LAP BELT	61.49	28.48	3982.00	3886.00	8
RT LAP BELT	68.12	27.75	3979.00	3892.00	9
TOTAL LAP	128.26	56.52	3981.00	3892.00	
TOTAL LAP / WT	0.87	0.38	3981.00	3892.00	
CROTCH STRAP	34.68	-70.34	3989.00	3901.00	10
LF SEAT LNK X	25.68	-151.76	4122.00	3907.00	18
RT SEAT LNK X	21.84	-69.16	3963.00	3904.00	19
TOTAL SEAT X	35.81	-219.70	3964.00	3907.00	
SEAT LNK Y	45.10	-79.47	3990.00	3907.00	35
LF SEAT PAN Z	481.73	39.75	3907.00	3643.00	11
RT SEAT PAN Z	529.30	41.07	3908.00	3628.00	12
CT SEAT PAN Z	687.02	51.60	3905.00	3604.00	13
TOTAL SEAT Z	1692.53	152.71	3907.00	3628.00	
TOTAL SEAT Z / WT	11.44	1.03	3907.00	3628.00	
RES SEAT FORCE	1708.57	153.49	3907.00	3628.00	
RES SEAT FORCE / WT	11.54	1.04	3907.00	3628.00	
LF FOOT X	10.25	-128.08	3854.00	3886.00	20
RT FOOT X	46.60	-49.45	3891.00	3885.00	23
CT FOOT X	14.65	-154.39	3853.00	3903.00	26
TOTAL FOOT X	48.42	-323.91	3853.00	3866.00	
LF FOOT Y	103.49	-7.44	3893.00	3844.00	21
RT FOOT Y	27.81	-77.79	3865.00	3901.00	24
CT FOOT Y	6.76	-75.11	3792.00	3899.00	27
TOTAL FOOT Y	55.47	-67.46	3867.00	3901.00	
LF FOOT Z	186.91	-23.12	3875.00	3843.00	22
RT FOOT Z	156.45	-24.28	3899.00	3864.00	25
CT FOOT Z	143.64	-139.77	3852.00	3886.00	28
TOTAL FOOT Z	401.21	-117.49	3892.00	3865.00	
RES FOOT FORCE	427.41	24.46	3898.00	3661.00	

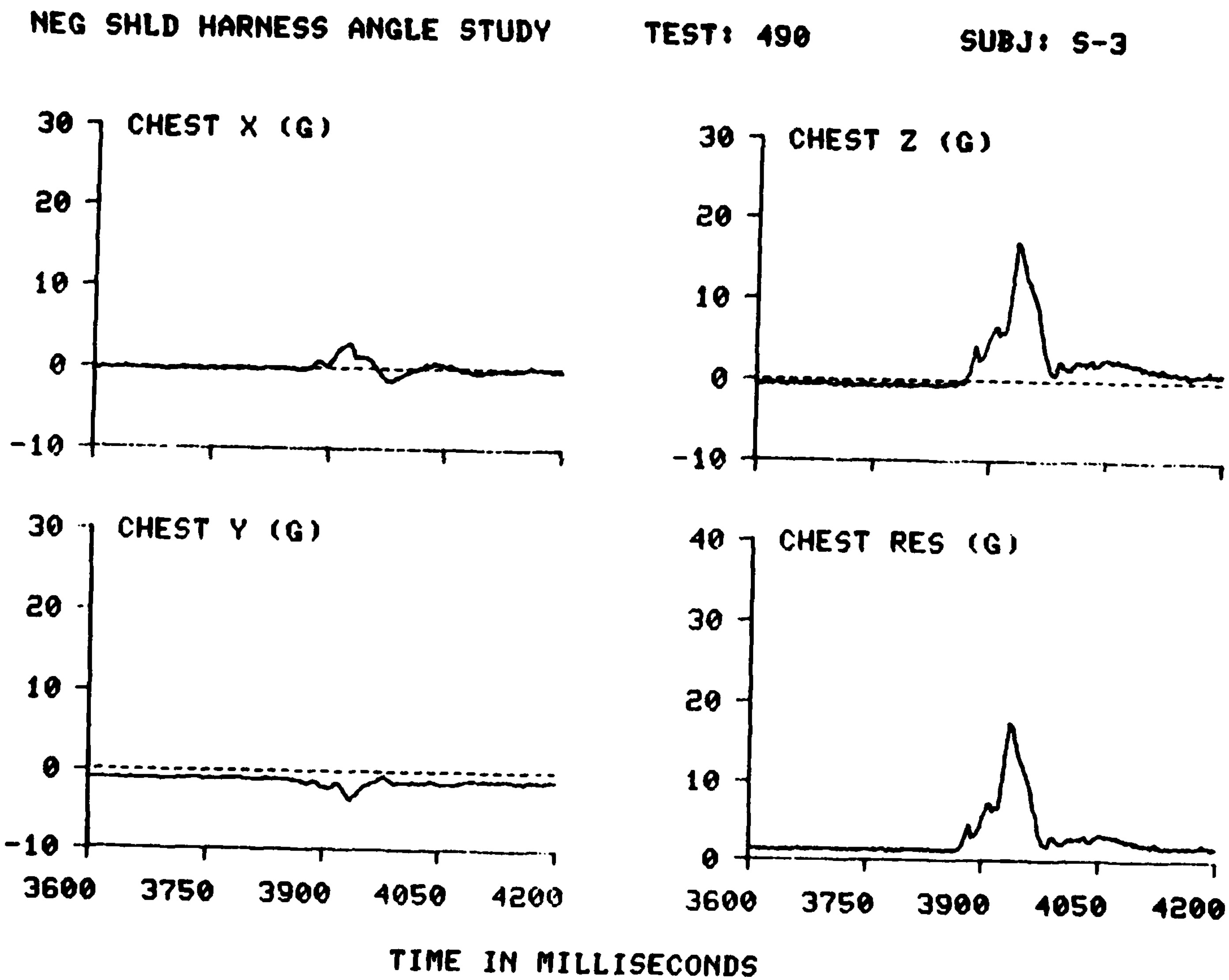
NEG SHLD HAR ANG TEST: 490 SUBJ: S-3 WT: 168.0 G: 10 GP: 1 CELL: J

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	134.00	514.00	48
CARRIAGE X	1.84	-1.18	3878.00	3891.00	35
CARRIAGE Y	0.95	-0.84	3869.00	3866.00	31
CARRIAGE Z	12.30	-0.24	3906.00	3700.00	1
CARRIAGE Z (SM)	10.33	-0.08	3909.00	3701.00	
CARRIAGE VEL	-1.20	-26.22	4196.00	3857.00	29
SEAT X	1.89	-1.34	3878.00	3889.00	32
SEAT Y	1.64	-1.80	3875.00	3860.00	33
SEAT Z	10.90	-0.17	3907.00	3777.00	34
SEAT Z (SM)	10.27	-0.09	3916.00	3726.00	
CHEST X	3.09	-1.55	3926.00	3976.00	5
CHEST Y	-0.70	-3.70	3979.00	3936.00	6
CHEST Z	17.12	-0.97	3935.00	3771.00	7
CHEST RES	17.55	1.05	3935.00	3741.00	
CHEST SI	31.95		3873.00	4117.00	
HEAD X	1.90	-3.44	3929.00	3977.00	2
HEAD Y	1.81	0.68	4015.00	3959.00	3
HEAD Z	13.21	-1.13	3932.00	3737.00	4
HEAD RES	13.43	1.16	3932.00	4139.00	
HEAD SI	19.97		3883.00	4001.00	
HEAD HIC	15.76		3903.00	3960.00	
SHD REFL LF	27.09	6.37	4009.00	3924.00	14
SHD REEL LF	51.22	13.46	3973.00	4060.00	16
LF SHOULDER	74.11	20.11	3973.00	3924.00	
SHD REFL RT	28.47	4.90	4009.00	3926.00	15
SHD REEL RT	47.97	-2.77	3972.00	3915.00	17
RT SHOULDER	67.24	3.11	3972.00	3916.00	
TOTAL SHLD REFL	55.55	11.64	4009.00	3925.00	
TOTAL SHLD REEL	99.11	11.95	3972.00	3924.00	
TOTAL SHOULDER	141.28	23.64	3973.00	3925.00	
TOTAL SHD / WT	0.84	0.14	3973.00	3925.00	
LF LAP BELT	57.20	28.54	3996.00	3912.00	8
RT LAP BELT	55.82	30.67	3994.00	4058.00	9
TOTAL LAP	112.84	60.09	3995.00	4058.00	
TOTAL LAP / WT	0.67	0.36	3995.00	4058.00	
CROTCH STRAP	61.09	-34.21	4004.00	3928.00	10
LF SEAT LNK X	4.53	-187.32	3818.00	3925.00	18
RT SEAT LNK X	8.90	-113.46	3792.00	3931.00	19
TOTAL SEAT X	8.55	-296.63	3813.00	3924.00	
SEAT LNK Y	47.51	-112.92	4171.00	3931.00	35
LF SEAT PAN Z	642.53	80.09	3934.00	4195.00	11
RT SEAT PAN Z	607.40	68.02	3932.00	4161.00	12
CT SEAT PAN Z	627.61	35.03	3933.00	3600.00	13
TOTAL SEAT Z	1869.22	230.42	3933.00	3609.00	
TOTAL SEAT Z / WT	11.13	1.37	3933.00	3609.00	
RES SEAT FORCE	1893.47	230.97	3933.00	3609.00	
RES SEAT FORCE / WT	11.27	1.37	3933.00	3609.00	
LF FOOT X	40.78	-72.24	3877.00	3945.00	20
RT FOOT X	33.38	-24.78	3876.00	3910.00	23
CT FOOT X	59.55	-146.17	3879.00	3925.00	26
TOTAL FOOT X	119.41	-202.36	3877.00	3945.00	
LF FOOT Y	72.97	-14.38	3910.00	3639.00	21
RT FOOT Y	27.39	-65.79	3970.00	3941.00	24
CT FOOT Y	63.38	-62.10	3948.00	3921.00	27
TOTAL FOOT Y	81.52	-59.39	3952.00	3923.00	
LF FOOT Z	164.92	-68.83	3944.00	3889.00	22
RT FOOT Z	97.57	-64.57	3912.00	3938.00	25
CT FOOT Z	321.89	-75.14	3941.00	3886.00	28
TOTAL FOOT Z	430.19	-165.87	3941.00	3889.00	
RES FOOT FORCE	457.04	6.71	3942.00	4200.00	

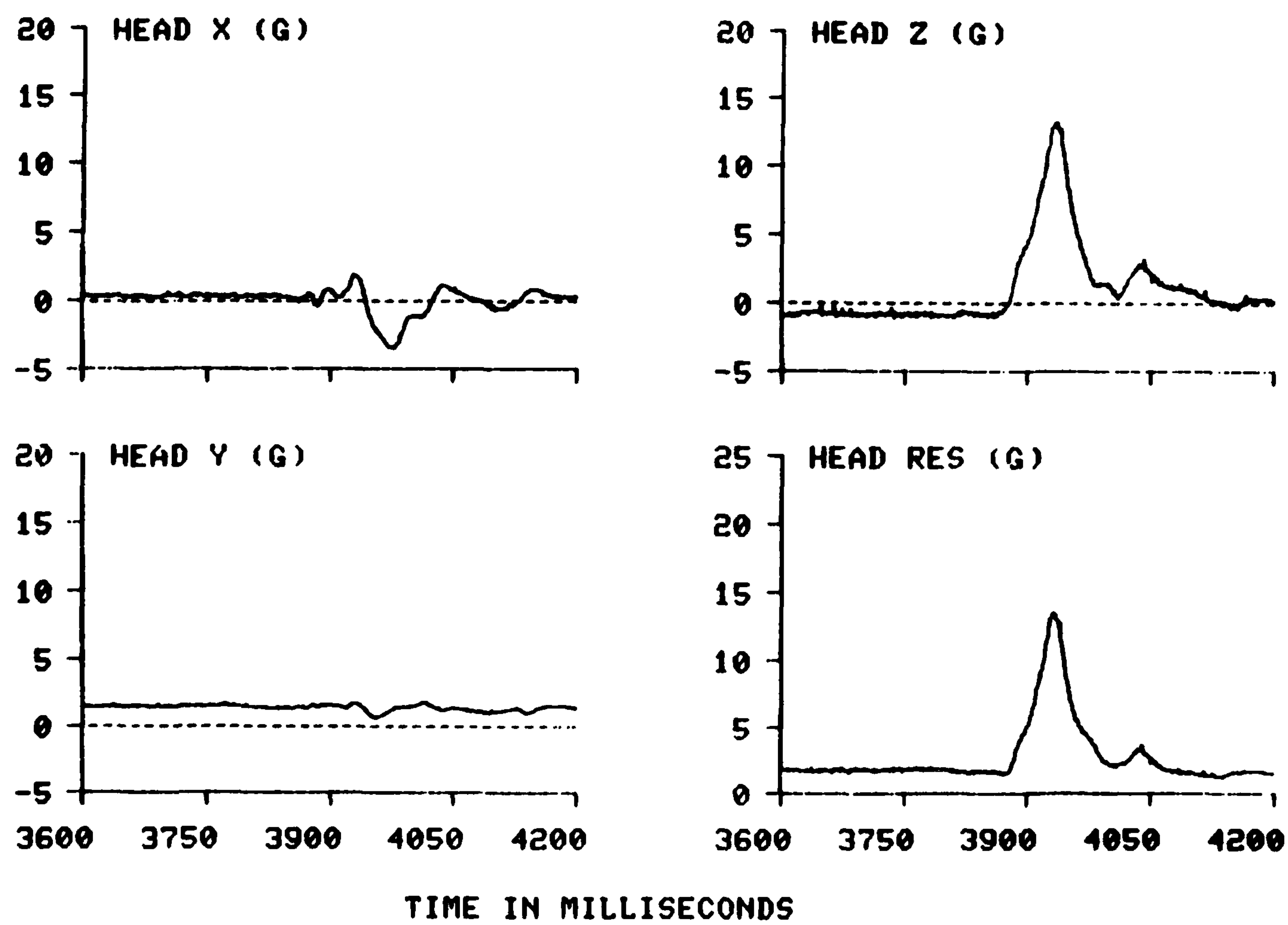

NEG SHLD HARNESS ANGLE STUDY
TEST: 490
SUBJ: S-3
CARRIAGE X (G)
CARRIAGE Z (G)
CARRIAGE Y (G)
CARRIAGE VEL (FPS)
15
10
5
0
-5
-10
-20
-30
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

NEG SHLD HARNESS ANGLE STUDY TEST: 490 SUBJ: S-3




NEG SHLD HARNESS ANGLE STUDY
TEST: 490
SUBJ: S-3
CHEST X (G)
CHEST Z (G)
CHEST Y (G)
CHEST RES (G)
30
20
10
0
-10
40
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

NEG SHLD HARNESS ANGLE STUDY TEST: 490 SUBJ: S-3



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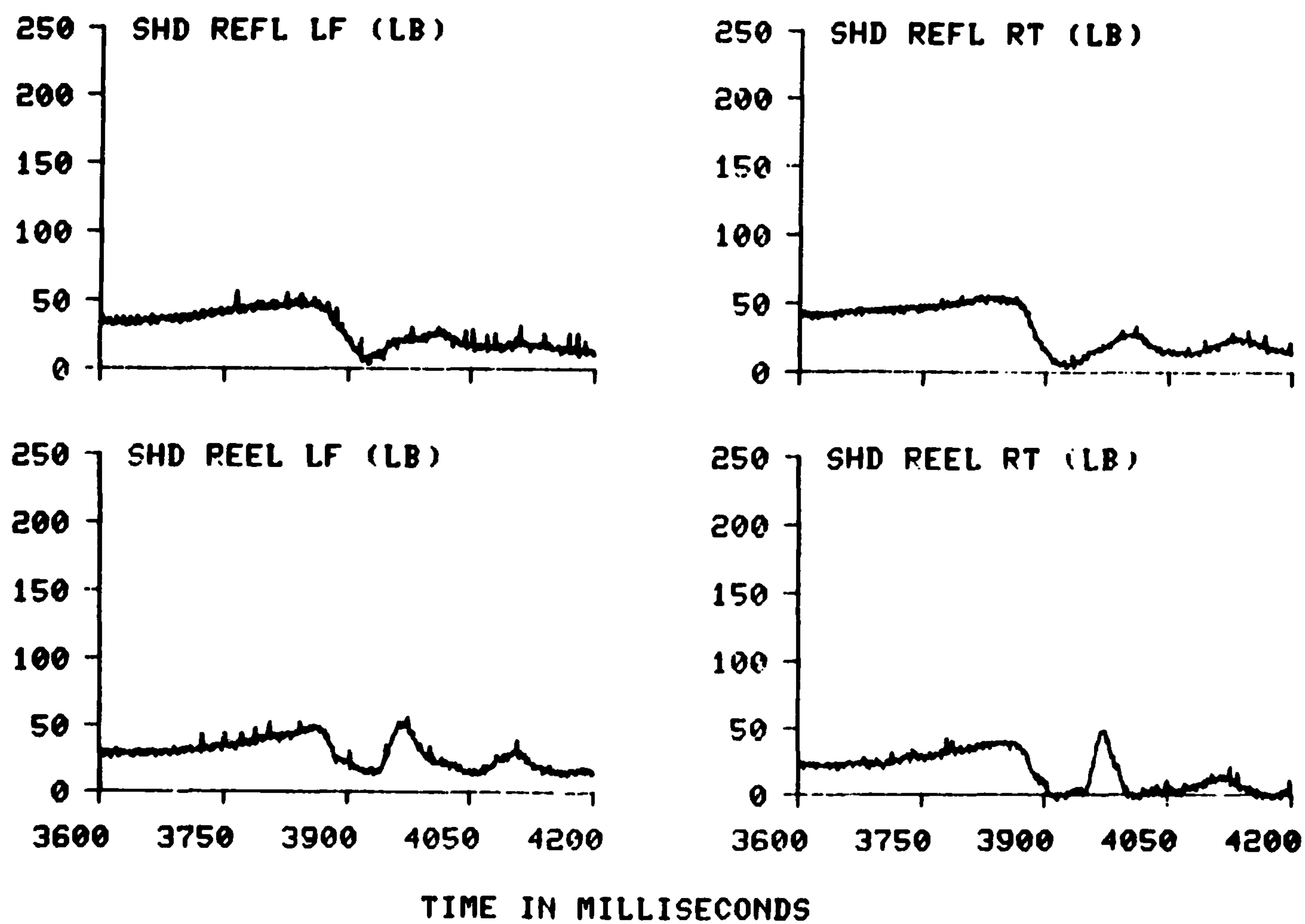
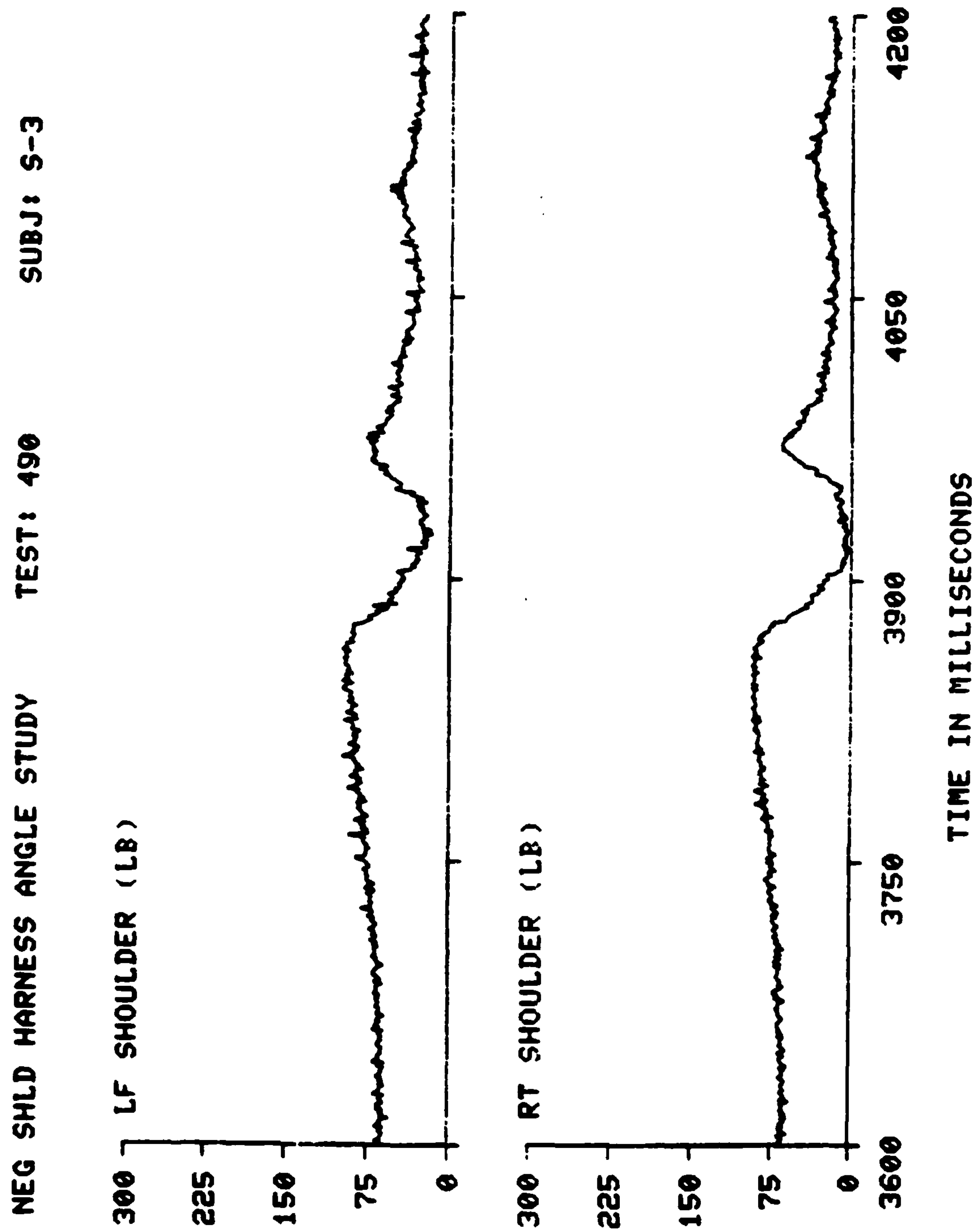
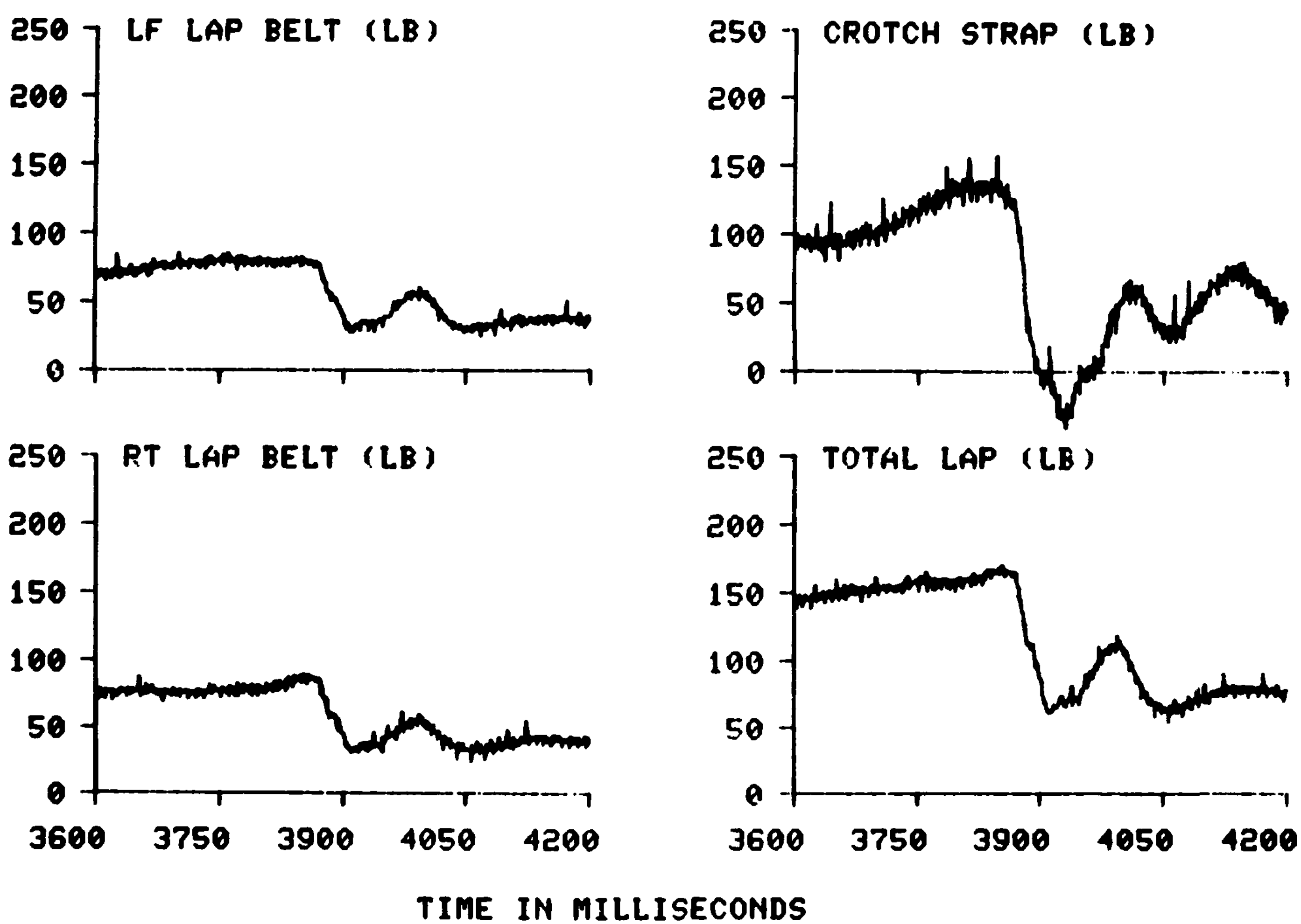
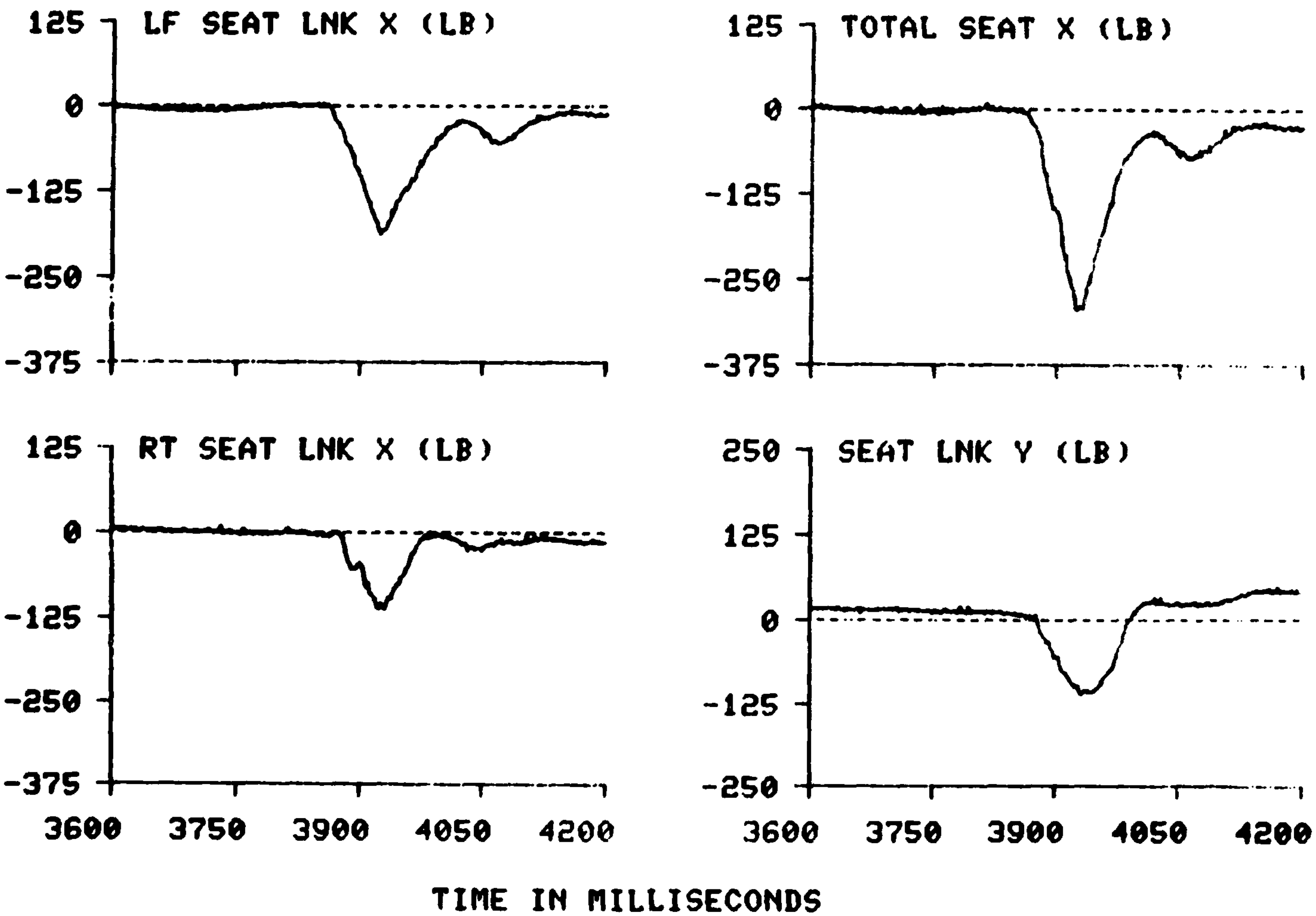


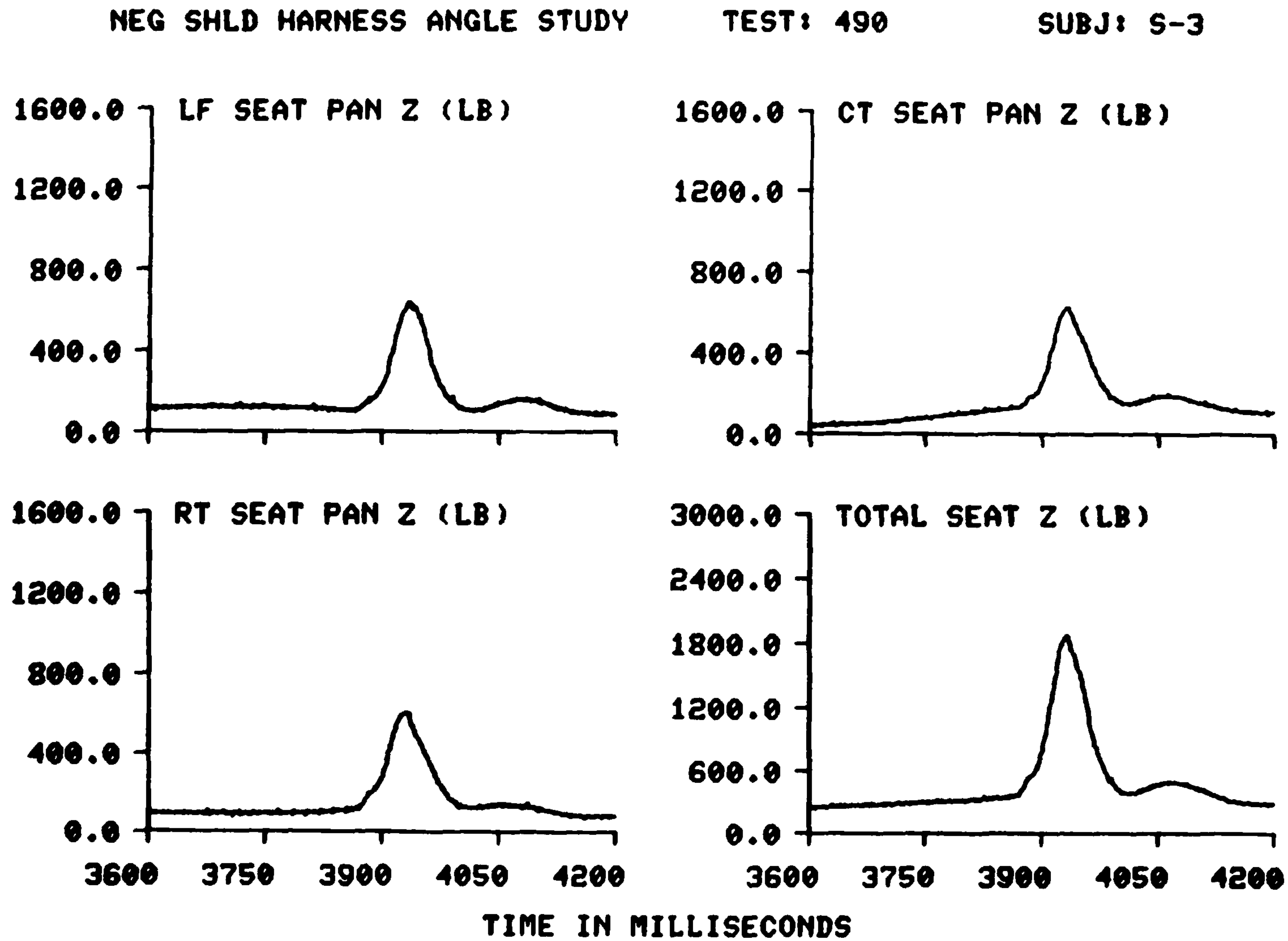

NEG SHLD HARNESS ANGLE STUDY
TEST: 490
SUBJ: S-3
LF SHOULDER (LB)
RT SHOULDER (LB)
300
225
150
75
0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

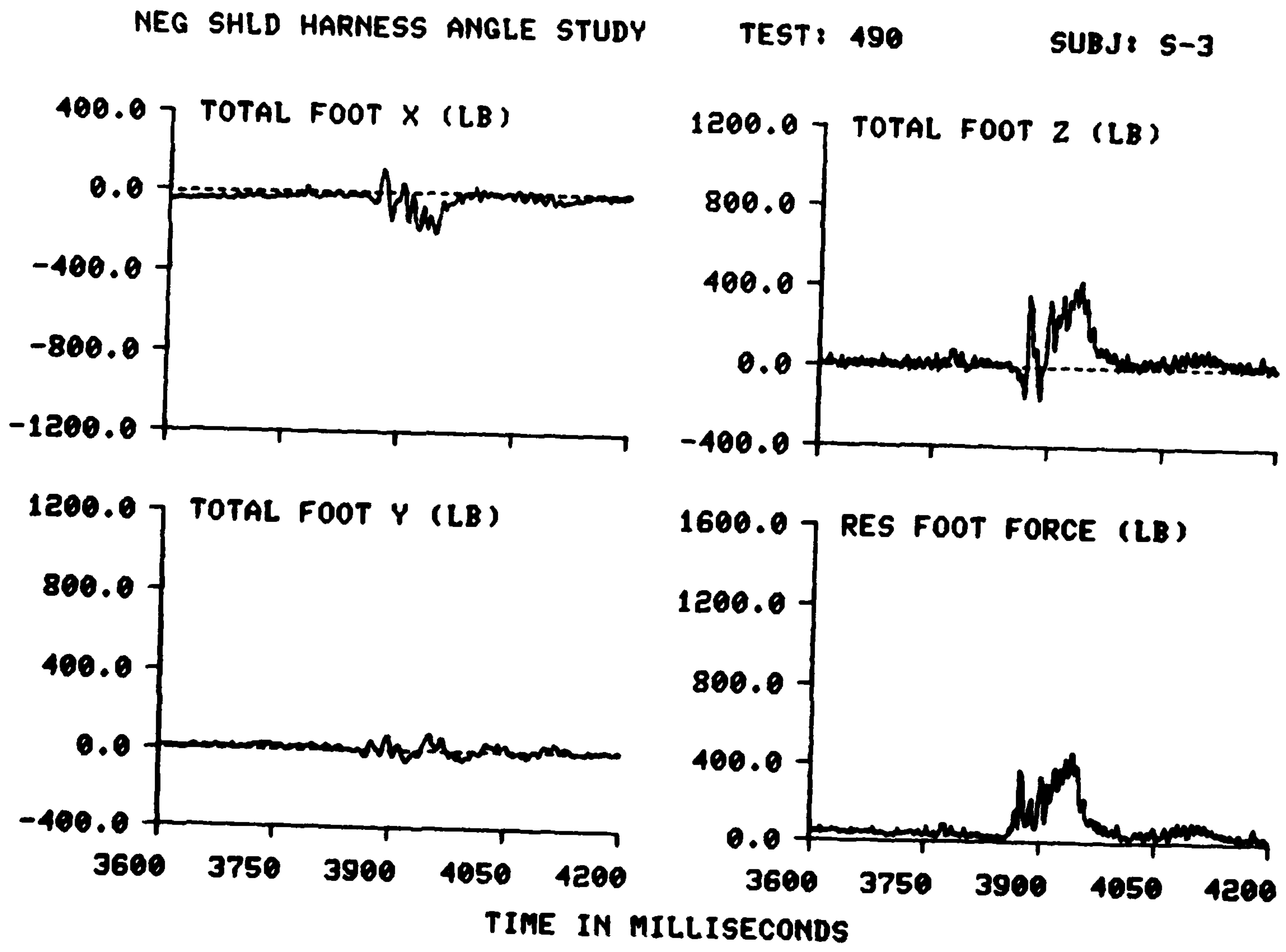
NEG SHLD HARNESS ANGLE STUDY TEST: 490 SUBJ: S-3



NEG SHLD HARNESS ANGLE STUDY   TEST: 490   SUBJ: S-3




NEG SHLD HARNESS ANGLE STUDY
TEST: 490
SUBJ: S-3
LF SEAT PAN Z (LB)
CT SEAT PAN Z (LB)
RT SEAT PAN Z (LB)
TOTAL SEAT Z (LB)
1600.0
1200.0
800.0
400.0
0.0
3000.0
2400.0
1800.0
1200.0
600.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


NEG SHLD HARNESS ANGLE STUDY
TEST: 490
SUBJ: S-3
TOTAL FOOT X (LB)
400.0
0.0
-400.0
-800.0
-1200.0
TOTAL FOOT Z (LB)
1200.0
800.0
400.0
0.0
-400.0
TOTAL FOOT Y (LB)
1200.0
800.0
400.0
0.0
-400.0
RES FOOT FORCE (LB)
1600.0
1200.0
800.0
400.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

APPENDIX C

WILCOXON ANALYSES

The electronic data from this test program were analyzed by means of the Wilcoxon paired-replicate rank test (Wilcoxon & Wilcox, 1964). A total of six comparisons were made by this technique. The means and standard deviations of each parameter in each comparison are summarized in Tables C-1 through C-6. Since the number of comparable tests in one comparison may be different from the number of comparable tests in another comparison, minor variations in the means and standard deviations in a cell of the test matrix may be noted among these tables. An asterisk designates a statistically significant trend in a parameter at the 90% confidence level for a two-tailed test. The statistically significant trends in all six comparisons are summarized in the body of the report in Table 5.

The Wilcoxon analyses of parameters for which there were statistically significant differences are also presented. In these computations, the arithmetic difference between the parameter means from each condition is first computed. These differences are then rank ordered from smallest to largest, without regard to sign. An integer from 1 to n, where n is the number of pairs in the comparison, is assigned to each difference so that the smallest difference receives the rank 1 and the largest difference receives the rank n. Then, the rank integer is given the same sign as the sign of the arithmetic difference to which it corresponds. The negative integers are summed and the positive integers are summed. Finally, if either sum is greater than or equal to the critical integer sum for the specified confidence level, then the means may be considered significantly different (i.e., from two different samples).

A complete set of Wilcoxon computations for all comparisons in this test program will be maintained by the Biomechanical Protection Branch of AFAMRL until this work unit is retired. These data will eventually be recorded in a permanent data bank within the Laboratory.

TABLE C-1

COMPARISON C-G

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations and loads.)

(n = 14)

TEST CONDITION F-111 HARNESS SEAT POSITION	C Modified Down		G Operational Down		Significant at 90% Confidence
	Mean	s	Mean	s	
CARRIAGE ACCELERATION (G)	10.5	0.13	10.5	0.20	
CARRIAGE VELOCITY (ft/sec)	-25.8	0.17	-25.9	0.64	
SEAT ACCELERATION (G)	10.6	0.14	10.6	0.27	
CHEST ACCELERATION (G)					
-X axis	-2.05	1.01	-1.96	0.51	
+X axis	4.38	1.20	3.57	0.93	*
+Z axis	20.3	2.85	17.3	2.44	*
Resultant	20.6	2.79	17.6	2.41	*
CHEST SEVERITY INDEX	35.4	5.91	33.0	4.22	
HEAD ACCELERATION (G)					
-X axis	-4.86	0.92	-3.34	1.05	*
+X axis	1.12	0.89	1.47	0.74	
+Z axis	13.2	0.91	12.3	0.63	*
Resultant	13.3	0.92	12.5	0.64	*
HEAD SEVERITY INDEX	19.5	2.17	18.9	1.94	
STRAP LOADS (lb)					
Reflection Straps	103	25	66	23	*
Inertia Reel Straps	110	28	76	22	*
Total Shoulder Straps	206	54	134	35	*
Total Lap Belt	92	27	90	29	
Crotch Strap	111	75	121	63	
SEAT PAN LOADS (lb)					
-X axis	-290	73	-277	67	
+Z axis	1750	243	1760	274	
Resultant	1770	246	1780	276	
FOOTREST LOADS (lb)					
-X axis	-369	89	-387	93	
+Z axis	456	60	456	74	
Resultant	538	95	556	105	

TABLE C-2

COMPARISON H-J

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations and loads.)

(n = 14)

TEST CONDITION F-111 HARNESS SEAT POSITION	H Modified Up		J Operational Up		Significant at 90% Confidence
	Mean	s	Mean	s	
CARRIAGE ACCELERATION (G)	10.5	0.18	10.5	0.24	
CARRIAGE VELOCITY (ft/sec)	-26.1	0.15	-26.2	0.06	
SEAT ACCELERATION (G)	10.7	0.39	10.6	0.30	
CHEST ACCELERATION (G)					
-X axis	-1.79	0.88	-2.59	0.97	*
+X axis	3.73	1.39	2.68	1.34	*
+Z axis	18.6	1.79	17.2	2.04	*
Resultant	18.8	1.71	17.4	2.02	*
CHEST SEVERITY INDEX	34.7	4.24	32.1	2.92	*
HEAD ACCELERATION (G)					
-X axis	-4.06	1.07	-3.24	1.07	*
+X axis	1.79	1.30	2.31	1.25	*
+Z axis	13.1	0.85	12.6	0.94	*
Resultant	13.3	0.86	12.9	0.96	*
HEAD SEVERITY INDEX	20.1	1.91	20.4	1.91	
STRAP LOADS (lb)					
Reflection Straps	81	13	63	13	*
Inertia Reel Straps	88	22	95	34	
Total Shoulder Straps	160	33	150	45	
Total Lap Belt	96	20	102	27	
Crotch Strap	140	52	93	32	*
SEAT PAN LOADS (lb)					
-X axis	-295	70	-281	57	
+Z axis	1770	209	1770	215	
Resultant	1790	213	1790	217	
FOOTREST LOADS (lb)					
-X axis	-345	93	-324	79	
+Z axis	467	82	443	71	*
Resultant	538	107	508	99	

TABLE C-3

COMPARISON C-J

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations and loads.)

(n = 12)

TEST CONDITION F-111 HARNESS SEAT POSITION	C Modified Down		J Operational Up		Significant at 90% Confidence
	Mean	s	Mean	s	
CARRIAGE ACCELERATION (G)	10.5	0.12	10.5	0.26	
CARRIAGE VELOCITY (ft/sec)	-25.8	0.17	-26.2	0.06	*
SEAT ACCELERATION (G)	10.6	0.15	10.5	0.32	
CHEST ACCELERATION (G)					
-X axis	-2.21	0.98	-2.40	0.86	
+X axis	4.25	1.25	2.84	1.37	*
+Z axis	20.6	2.88	17.3	2.18	*
Resultant	20.9	2.83	17.4	2.17	*
CHEST SEVERITY INDEX	36.1	5.93	32.2	3.10	*
HEAD ACCELERATION (G)					
-X axis	-4.93	0.98	-3.36	1.10	*
+X axis	1.23	0.91	2.02	0.96	
+Z axis	13.2	0.95	12.7	0.84	*
Resultant	13.4	0.94	12.9	0.84	*
HEAD SEVERITY INDEX	19.4	2.27	20.2	1.90	
STRAP LOADS (lb)					
Reflection Straps	103	27	59	10	*
Inertia Reel Straps	111	30	87	28	*
Total Shoulder Straps	206	59	139	37	*
Total Lap Belt	88	26	99	24	*
Crotch Strap	89	51	86	29	
SEAT PAN LOADS (lb)					
-X axis	-286	76	-283	60	
+Z axis	1680	175	1750	220	*
Resultant	1700	181	1770	222	*
FOOTREST LOADS (lb)					
-X axis	-347	70	-304	58	*
+Z axis	440	43	430	65	
Resultant	509	60	484	74	*

TABLE C-4

COMPARISON H-G

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations and loads.)

(n = 15)

TEST CONDITION F-111 HARNESS SEAT POSITION	H Modified Up		G Operational Down		Significant at 90% Confidence
	Mean	s	Mean	s	
CARRIAGE ACCELERATION (G)	10.5	0.18	10.5	0.21	
CARRIAGE VELOCITY (ft/sec)	-26.1	0.14	-25.9	0.62	
SEAT ACCELERATION (G)	10.7	0.38	10.7	0.34	
CHEST ACCELERATION (G)					
-X axis	-2.01	0.58	-1.77	0.86	
+X axis	3.66	1.37	3.54	0.89	
+Z axis	18.3	1.96	17.1	2.07	*
Resultant	18.6	1.88	17.4	2.05	*
CHEST SEVERITY INDEX	34.4	4.25	32.6	4.29	*
HEAD ACCELERATION (G)					
-X axis	-4.07	1.03	-3.31	1.09	*
+X axis	1.72	1.29	1.67	1.00	
+Z axis	13.0	0.94	12.5	0.82	*
Resultant	13.2	0.97	12.6	0.84	*
HEAD SEVERITY INDEX	19.8	2.20	19.4	2.04	
STRAP LOADS (lb)					
Reflection Straps	80	13	61	12	*
Inertia Reel Straps	86	22	74	24	*
Total Shoulder Straps	156	35	129	32	*
Total Lap Belt	97	20	84	20	*
Crotch Strap	140	50	104	29	*
SEAT PAN LOADS (lb)					
-X axis	-295	68	-277	66	
+Z axis	1760	204	1700	211	*
Resultant	1790	207	1720	213	*
FOOTREST LOADS (lb)					
-X axis	-338	94	-381	90	*
+Z axis	461	83	461	76	
Resultant	530	107	552	102	

TABLE C-5

COMPARISON C-H

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations [illegible]

(n = 12)

TEST CONDITION	C		H		[illegible]
F-111 HARNESS	Modified		Modified		[illegible]
SEAT POSITION	Down		Up		[illegible]
	Mean	s	Mean	s	
CARRIAGE ACCELERATION (G)	10.5	0.12	10.5	[illegible]	
CARRIAGE VELOCITY (ft/sec)	-25.8	0.17	-26.1	[illegible]	
SEAT ACCELERATION (G)	10.6	0.15	10.7	[illegible]	
CHEST ACCELERATION (G)					
-X axis	-2.21	0.98	-1.65	[illegible]	
+X axis	4.25	1.25	3.88	1.34	
+Z axis	20.6	2.88	18.5	1.89	
Resultant	20.9	2.83	18.9	1.80	
CHEST SEVERITY INDEX	36.1	5.93	34.3	4.30	
HEAD ACCELERATION (G)					
-X axis	-4.93	0.98	-4.20	1.06	*
+X axis	1.23	0.91	1.38	0.80	
+Z axis	13.2	0.95	13.2	[illegible]	
Resultant	13.4	0.94	13.3	[illegible]	
HEAD SEVERITY INDEX	19.4	2.27	19.7	[illegible]	
STRAP LOADS (lb)					
Reflection Straps	103	27	82	13	*
Inertia Reel Straps	111	30	85	22	*
Total Shoulder Straps	206	59	157	34	*
Total Lap Belt	88	26	96	19	
Crotch Strap	89	51	135	53	*
SEAT PAN LOADS (lb)					
-X axis	-286	76	-294	76	
+Z axis	1680	175	1730	208	
Resultant	1700	181	1760	212	
FOOTREST LOADS (lb)					
-X axis	-347	70	-320	74	
+Z axis	440	43	449	71	
Resultant	509	60	510	83	

TABLE C-6

COMPARISON G-J

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations and loads.)

(n = 14)

TEST CONDITION F-111 HARNESS SEAT POSITION	G Operational Down		J Operational Up		Significant at 90% Confidence
	Mean	s	Mean	s	
CARRIAGE ACCELERATION (G)	10.5	0.20	10.5	0.24	
CARRIAGE VELOCITY (ft/sec)	-25.9	0.64	-26.2	0.06	
SEAT ACCELERATION (G)	10.7	0.31	10.6	0.30	
CHEST ACCELERATION (G)					
-X axis	-2.03	0.59	-2.59	0.97	*
+X axis	3.55	0.92	2.68	1.34	*
+Z axis	17.2	2.11	17.2	2.04	
Resultant	17.4	2.10	17.4	2.02	
CHEST SEVERITY INDEX	32.8	4.38	32.1	2.92	
HEAD ACCELERATION (G)					
-X axis	-3.28	1.10	-3.24	1.07	
+X axis	1.72	1.02	2.31	1.25	*
+Z axis	12.3	0.74	12.6	0.94	
Resultant	12.5	0.79	12.9	0.96	*
HEAD SEVERITY INDEX	19.3	2.07	20.4	1.91	*
STRAP LOADS (lb)					
Reflection Straps	61	13	63	13	
Inertia Reel Straps	76	23	95	34	*
Total Shoulder Straps	131	33	150	45	*
Total Lap Belt	85	20	102	27	*
Crotch Strap	105	30	93	32	
SEAT PAN LOADS (lb)					
-X axis	-273	66	-281	57	
+Z axis	1710	217	1770	215	*
Resultant	1730	219	1790	217	*
FOOTREST LOADS (lb)					
-X axis	-385	93	-324	79	*
+Z axis	458	79	443	71	
Resultant	555	105	508	99	

WILCOXON ANALYSIS

ANALYSIS OF: CHEST X

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	5.09	4.20	0.89	0.00	0.10	1.00	0.00	1.00
G-2	3.85	3.33	0.52	-0.13	0.00	2.00	2.00	0.00
F-2	3.68	3.53	0.15	0.00	0.15	3.00	0.00	3.00
K-1	6.35	4.58	1.77	-0.17	0.00	4.00	4.00	0.00
M13	3.36	3.49	-0.13	0.00	0.20	5.00	0.00	5.00
A-2	5.69	4.93	0.76	0.00	0.52	6.00	0.00	6.00
A-3	5.12	4.13	0.99	0.00	0.71	7.00	0.00	7.00
P-3	5.14	2.50	2.64	0.00	0.76	8.00	0.00	8.00
S-3	3.97	3.77	0.20	0.00	0.89	9.00	0.00	9.00
M10	5.16	3.20	1.96	0.00	0.96	10.00	0.00	10.00
F-3	3.03	2.07	0.96	0.00	0.99	11.00	0.00	11.00
M11	3.76	3.93	-0.17	0.00	1.77	12.00	0.00	12.00
D-1	5.23	4.52	0.71	0.00	1.96	13.00	0.00	13.00
M-2	1.93	1.83	0.10	0.00	2.64	14.00	0.00	14.00

MEAN A: 4.38 STD DEV A: 1.20 SUM OF N MINUS: 6.00 -------
MEAN B: 3.57 STD DEV B: 0.93 SUM OF N PLUS : ------- 99.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST Z

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	21.86	21.87	-0.01	-0.01	0.00	1.00	1.00	0.00
G-2	22.74	14.91	7.83	0.00	1.42	2.50	0.00	2.50
F-2	22.88	16.31	6.57	0.00	1.42	2.50	0.00	2.50
K-1	18.62	15.98	2.64	-1.43	0.00	4.00	4.00	0.00
M13	25.04	16.55	8.49	0.00	1.93	5.00	0.00	5.00
A-2	18.25	15.32	2.93	0.00	2.10	6.00	0.00	6.00
A-3	16.92	21.53	-4.61	0.00	2.64	7.00	0.00	7.00
P-3	19.48	20.91	-1.43	0.00	2.93	8.00	0.00	8.00
S-3	25.39	16.44	8.95	0.00	3.01	9.00	0.00	9.00
M10	17.67	16.25	1.42	-4.61	0.00	10.00	10.00	0.00
F-3	19.12	16.11	3.01	0.00	6.57	11.00	0.00	11.00
M11	18.77	16.84	1.93	0.00	7.83	12.00	0.00	12.00
D-1	16.73	14.63	2.10	0.00	8.49	13.00	0.00	13.00
M-2	20.08	18.66	1.42	0.00	8.95	14.00	0.00	14.00

MEAN A: 20.25 STD DEV A: 2.85 SUM OF N MINUS: 15.00 -------
MEAN B: 17.31 STD DEV B: 2.44 SUM OF N PLUS : ------- 90.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST RE[illegible]

FUNCTION A = G: 10 CELL: C
FUNCTION B = G: 10 CELL: G

ABS
ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	22.29	22.06	0.23	0.00	0.23	1.00	0.00	1.00
G-2	22.87	14.94	7.93	1.03	0.[illegible]0	2.00	2.00	0.00
F-2	23.17	16.57	6.60	0.00	1.11	3.00	0.00	3.00
K-1	19.23	16.43	2.8[illegible]	0.00	1.40	4.00	0.00	4.0[illegible]
M13	25.23	16.69	8.54	0.00	1.67	5.00	0.00	5.00
A-2	18.75	15.53	3.2[illegible]	0.00	2.18	6.00	0.00	6.00
A-3	17.30	21.72	4.[illegible]	0.00	2.80	7.00	0.00	7.00
P-3	20.04	21.07	1.[illegible]3	0.00	3.02	8.00	0.00	8.00
S-3	25.49	16.87	8.62	0.00	3.22	9.00	0.00	9.00
M10	17.74	16.63	1.11	4.42	0.00	10.00	10.00	0.00
F-3	19.21	16.19	3.02	0.00	6.60	11.00	0.00	11.00
M11	19.07	17.20	1.97	0.00	7.93	12.00	0.00	12.00
D-1	17.17	14.99	2.18	0.00	8.54	13.00	0.00	13.00
M-2	20.15	18.[illegible]	1.[illegible]	[illegible]	8.62	14.00	0.00	14.00

MEAN A: 20.55 STD DEV A: 2.74
MEAN B: 17.55 STD DEV B: [illegible]

SUM OF N MINUS: 12.00
SUM OF N PLUS : 93.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: C
FUNCTION B = G: 10 CELL: G

MIN
MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	-6.27	4.57	1.70	0.07	0.00	1.00	1.00	0.00
G-2	-5.75	-3.3[illegible]	-2.40	-0.37	0.00	2.00	2.00	0.00
F-2	-4.47	2.85	1.62	-0.84	0.00	3.00	3.00	0.00
K-1	-6.03	4.46	-1.57	-0.88	0.00	4.00	4.00	0.00
M13	-5.38	-2.31	-3.07	1.14	0.00	5.00	5.00	0.00
A-2	-4.49	-4.12	-0.37	1.32	0.00	6.00	6.00	0.00
A-3	-5.39	3.95	1.44	-1.44	0.00	7.00	7.00	0.00
P-3	-4.30	-2.98	1.32	1.57	0.00	8.00	8.00	0.00
S-3	-4.02	2.88	1.14	1.62	0.00	9.00	9.00	0.00
M10	-3.43	-2.5[illegible]	0.88	1.7[illegible]	0.00	10.00	10.00	0.00
F-3	-3.95	1.43	2.52	2.29	0.00	11.00	11.00	0.00
M11	3.93	-3.86	0.07	2.40	0.00	12.00	12.00	0.00
D-1	-4.62	[illegible]	[illegible]	[illegible]	0.00	13.00	13.00	0.00
M-2	5.4[illegible]	[illegible]	[illegible]	[illegible]	0.00	14.00	14.00	0.00

MEAN A: -4.86 STD DEV A: [illegible]
MEAN B: -3.34 STD DEV B: 1.[illegible]5

SUM OF N MINUS: 105.00
SUM OF N PLUS : 0.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD Z

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	13.02	11.80	1.22	-0.01	0.00	1.00	1.00	0.00
G-2	12.39	12.40	-0.01	0.00	0.13	2.00	0.00	2.00
F-2	14.62	13.10	1.52	-0.15	0.00	3.00	3.00	0.00
K-1	12.31	11.22	1.09	0.00	0.23	4.00	0.00	4.00
M13	13.15	12.76	0.39	0.00	0.39	5.00	0.00	5.00
A-2	14.21	12.82	1.39	0.00	0.63	6.00	0.00	6.00
A-3	13.32	12.20	1.12	0.00	1.09	7.00	0.00	7.00
P-3	12.43	12.30	0.13	0.00	1.12	8.00	0.00	8.00
S-3	13.69	13.46	0.23	0.00	1.22	9.00	0.00	9.00
M10	14.37	12.69	1.68	0.00	1.39	10.00	0.00	10.00
F-3	13.56	11.86	1.70	0.00	1.52	11.00	0.00	11.00
M11	12.89	12.26	0.63	0.00	1.68	12.00	0.00	12.00
D-1	13.74	11.86	1.88	0.00	1.70	13.00	0.00	13.00
M-2	11.31	11.46	-0.15	0.00	1.88	14.00	0.00	14.00

MEAN A: 13.22 STD DEV A: 0.91 SUM OF N MINUS: 4.00 -------
MEAN B: 12.30 STD DEV B: 0.63 SUM OF N PLUS : ------- 101.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD RES

FUNCTION A = G: 10 CELL: C ABS
FUNCTION B = G: 10 CELL: G ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	13.03	12.17	0.86	-0.01	0.00	1.00	1.00	0.00
G-2	12.42	12.43	-0.01	0.00	0.14	2.00	0.00	2.00
F-2	14.82	13.36	1.46	0.00	0.16	3.00	0.00	3.00
K-1	12.43	11.41	1.02	0.00	0.24	4.00	0.00	4.00
M13	13.21	12.94	0.27	0.00	0.27	5.00	0.00	5.00
A-2	14.41	12.92	1.49	0.00	0.75	6.00	0.00	6.00
A-3	13.33	12.43	0.90	0.00	0.86	7.00	0.00	7.00
P-3	12.47	12.33	0.14	0.00	0.90	8.00	0.00	8.00
S-3	13.87	13.63	0.24	0.00	1.02	9.00	0.00	9.00
M10	14.49	12.79	1.70	0.00	1.46	10.00	0.00	10.00
F-3	13.58	11.86	1.72	0.00	1.49	11.00	0.00	11.00
M11	13.11	12.36	0.75	0.00	1.70	12.00	0.00	12.00
D-1	14.02	12.15	1.87	0.00	1.72	13.00	0.00	13.00
M-2	11.63	11.47	0.16	0.00	1.87	14.00	0.00	14.00

MEAN A: 13.34 STD DEV A: 0.92 SUM OF N MINUS: 1.00 -------
MEAN B: 12.45 STD DEV B: 0.64 SUM OF N PLUS : ------- 104.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REFL

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	119.18	68.61	50.57	0.00	6.57	1.00	0.00	1.00
G-2	72.40	37.22	35.18	0.00	7.74	2.00	0.00	2.00
F-2	107.94	53.74	54.20	-16.74	0.00	3.00	3.00	0.00
K-1	80.21	61.26	18.95	0.00	18.95	4.00	0.00	4.00
M13	135.88	62.45	73.43	0.00	26.63	5.00	0.00	5.00
A-2	65.21	57.47	7.74	0.00	32.16	6.00	0.00	6.00
A-3	110.82	66.57	44.25	0.00	35.18	7.00	0.00	7.00
P-3	109.74	103.17	6.57	0.00	44.25	8.00	0.00	8.00
S-3	107.03	57.13	49.90	0.00	49.90	9.00	0.00	9.00
M10	73.21	46.58	26.63	0.00	50.57	10.00	0.00	10.00
F-3	134.52	81.51	53.01	0.00	53.01	11.00	0.00	11.00
M11	84.35	52.19	32.16	0.00	54.20	12.00	0.00	12.00
D-1	105.38	122.12	-16.74	0.00	73.43	13.00	0.00	13.00
M-2	142.32	57.48	84.84	0.00	84.84	14.00	0.00	14.00

MEAN A: 103.44 STD DEV A: 25.04 SUM OF N MINUS: 3.00 -------
MEAN B: 66.25 STD DEV B: 22.50 SUM OF N PLUS : ------- 102.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REEL

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	137.25	115.75	21.50	0.00	1.87	1.00	0.00	1.00
G-2	98.47	39.83	58.64	0.00	2.95	2.00	0.00	2.00
F-2	141.31	62.66	78.65	0.00	9.17	3.00	0.00	3.00
K-1	74.81	57.45	17.36	0.00	9.98	4.00	0.00	4.00
M13	130.38	83.32	47.06	0.00	17.36	5.00	0.00	5.00
A-2	62.10	59.15	2.95	0.00	21.50	6.00	0.00	6.00
A-3	114.87	78.49	36.38	0.00	23.37	7.00	0.00	7.00
P-3	109.72	107.85	1.87	0.00	36.38	8.00	0.00	8.00
S-3	115.46	72.82	42.64	0.00	38.69	9.00	0.00	9.00
M10	71.71	62.54	9.17	0.00	42.64	10.00	0.00	10.00
F-3	133.82	110.45	23.37	0.00	47.06	11.00	0.00	11.00
M11	100.75	62.06	38.69	0.00	58.64	12.00	0.00	12.00
D-1	95.09	85.11	9.98	0.00	78.65	13.00	0.00	13.00
M-2	152.73	69.27	83.46	0.00	83.46	14.00	0.00	14.00

MEAN A: 109.89 STD DEV A: 27.77 SUM OF N MINUS: 0.00 -------
MEAN B: 76.20 STD DEV B: 22.31 SUM OF N PLUS : ------- 105.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHOULDER

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	256.32	184.29	72.03	0.00	12.01	1.00	0.00	1.00
G-2	167.12	75.90	91.22	0.00	17.93	2.00	0.00	2.00
F-2	240.70	116.39	124.31	0.00	27.21	3.00	0.00	3.00
K-1	137.30	109.17	28.13	0.00	28.13	4.00	0.00	4.00
M13	265.70	144.84	120.86	0.00	32.63	5.00	0.00	5.00
A-2	120.70	108.69	12.01	0.00	63.09	6.00	0.00	6.00
A-3	224.50	142.36	82.14	0.00	72.03	7.00	0.00	7.00
P-3	216.66	184.03	32.63	0.00	73.14	8.00	0.00	8.00
S-3	209.19	123.68	85.51	0.00	82.14	9.00	0.00	9.00
M10	133.52	106.31	27.21	0.00	85.51	10.00	0.00	10.00
F-3	259.04	185.90	73.14	0.00	91.22	11.00	0.00	11.00
M11	170.31	107.22	63.09	0.00	120.86	12.00	0.00	12.00
D-1	189.95	172.02	17.93	0.00	124.31	13.00	0.00	13.00
M-2	292.51	121.85	170.66	0.00	170.66	14.00	0.00	14.00

MEAN A: 205.97 STD DEV A: 54.32 SUM OF N MINUS: 0.00 -------
MEAN B: 134.48 STD DEV B: 35.12 SUM OF N PLUS : ------- 105.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST X

FUNCTION A = G: 10 CELL: H MIN
FUNCTION B = G: 10 CELL: J MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	-2.12	-2.87	0.75	-0.09	0.00	1.00	1.00	0.00
H-4	-2.78	-4.41	1.63	0.00	0.27	2.00	0.00	2.00
M13	-1.64	-3.00	1.36	0.00	0.45	3.00	0.00	3.00
A-3	-1.10	-2.11	1.01	0.00	0.50	4.50	0.00	4.50
G-3	-2.34	-2.79	0.45	0.00	0.50	4.50	0.00	4.50
M-2	-3.22	-3.72	0.50	0.00	0.52	6.00	0.00	6.00
S-3	-0.39	-1.55	1.16	0.00	0.58	7.00	0.00	7.00
K-1	-0.64	-1.16	0.52	0.00	0.75	8.00	0.00	8.00
F-2	-1.84	-3.60	1.76	0.00	0.82	9.00	0.00	9.00
A-2	-0.29	-1.11	0.82	0.00	1.01	10.00	0.00	10.00
M11	-2.01	-2.28	0.27	0.00	1.16	11.00	0.00	11.00
H-3	-2.44	-3.02	0.58	0.00	1.36	12.00	0.00	12.00
M10	-2.06	-1.97	-0.09	0.00	1.63	13.00	0.00	13.00
G-2	-2.19	-2.69	0.50	0.00	1.76	14.00	0.00	14.00

MEAN A: -1.79 STD DEV A: 0.88 SUM OF N MINUS: 1.00 -------
MEAN B: -2.59 STD DEV B: 0.97 SUM OF N PLUS : ------- 104.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST X

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	2.04	1.57	0.47	0.00	0.06	1.00	0.00	1.00
H-4	1.47	1.15	0.32	0.00	0.30	2.00	0.00	2.00
M13	3.27	2.79	0.48	0.00	0.32	3.00	0.00	3.00
A-3	3.79	2.70	1.09	0.00	0.39	4.00	0.00	4.00
G-3	4.51	4.45	0.06	0.00	0.47	5.00	0.00	5.00
M-2	1.71	1.32	0.39	0.00	0.48	6.00	0.00	6.00
S-3	4.36	3.09	1.27	0.00	1.03	7.00	0.00	7.00
K-1	7.06	5.89	1.17	0.00	1.09	8.00	0.00	8.00
F-2	4.24	1.87	2.37	0.00	1.17	9.00	0.00	9.00
A-2	4.09	3.79	0.30	0.00	1.27	10.00	0.00	10.00
M11	4.22	3.19	1.03	0.00	1.83	11.00	0.00	11.00
H-3	4.20	2.29	1.91	0.00	1.91	12.00	0.00	12.00
M10	3.63	1.80	1.83	0.00	2.08	13.00	0.00	13.00
G-2	3.64	1.56	2.08	0.00	2.37	14.00	0.00	14.00

MEAN A: 3.73 STD DEV A: 1.39 SUM OF N MINUS: 0.00 -------
MEAN B: 2.68 STD DEV B: 1.34 SUM OF N PLUS : ------- 105.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST Z

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	15.64	16.14	-0.50	0.00	0.41	1.00	0.00	1.00
H-4	17.19	16.07	1.12	-0.50	0.00	2.00	2.00	0.00
M13	20.47	20.97	-0.50	-0.50	0.00	3.00	3.00	0.00
A-3	20.70	18.18	2.52	0.00	0.83	4.00	0.00	4.00
G-3	21.09	19.17	1.92	0.00	1.12	5.00	0.00	5.00
M-2	20.55	19.72	0.83	0.00	1.12	6.00	0.00	6.00
S-3	18.24	17.12	1.12	0.00	1.20	7.00	0.00	7.00
K-1	16.46	16.05	0.41	0.00	1.92	8.00	0.00	8.00
F-2	16.98	19.04	-2.06	-2.06	0.00	9.00	9.00	0.00
A-2	17.05	13.66	3.39	0.00	2.12	10.00	0.00	10.00
M11	18.27	16.15	2.12	0.00	2.52	11.00	0.00	11.00
H-3	19.09	17.89	1.20	0.00	3.26	12.00	0.00	12.00
M10	20.24	15.97	4.27	0.00	3.39	13.00	0.00	13.00
G-2	18.04	14.78	3.26	0.00	4.27	14.00	0.00	14.00

MEAN A: 18.57 STD DEV A: 1.79 SUM OF N MINUS: 14.00 -------
MEAN B: 17.21 STD DEV B: 2.04 SUM OF N PLUS : ------- 91.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST RES

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	15.73	16.15	-0.42	-0.42	0.00	1.00	1.00	0.00
H-4	17.40	16.42	0.98	-0.46	0.00	2.00	2.00	0.00
M13	20.64	21.10	-0.46	0.00	0.72	3.50	0.00	3.50
A-3	21.10	18.49	2.61	0.00	0.72	3.50	0.00	3.50
G-3	21.13	19.18	1.95	0.00	0.98	5.00	0.00	5.00
M-2	20.56	19.84	0.72	0.00	1.14	6.00	0.00	6.00
S-3	18.69	17.55	1.14	0.00	1.30	7.00	0.00	7.00
K-1	17.26	16.54	0.72	-1.46	0.00	8.00	8.00	0.00
F-2	17.63	19.11	-1.48	0.00	1.88	9.00	0.00	9.00
A-2	17.34	13.77	3.57	0.00	1.95	10.00	0.00	10.00
M11	18.35	16.46	1.89	0.00	2.61	11.00	0.00	11.00
H-3	19.33	18.03	1.30	0.00	3.24	12.00	0.00	12.00
M10	20.38	16.02	4.36	0.00	3.57	13.00	0.00	13.00
G-2	18.11	14.87	3.24	0.00	4.36	14.00	0.00	14.00

MEAN A: 18.83 STD DEV A: 1.71 SUM OF N MINUS: 11.00 -------
MEAN B: 17.40 STD DEV B: 2.02 SUM OF N PLUS : ------- 94.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST SI

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	28.38	33.19	-4.81	0.00	0.56	1.00	0.00	1.00
H-4	34.58	29.88	4.70	-0.67	0.00	2.00	2.00	0.00
M13	37.05	36.49	0.56	0.00	1.12	3.00	0.00	3.00
A-3	38.44	31.24	7.20	0.00	1.71	4.00	0.00	4.00
G-3	38.53	31.80	6.73	-1.85	0.00	5.00	5.00	0.00
M-2	39.00	37.29	1.71	0.00	2.10	6.00	0.00	6.00
S-3	34.05	31.95	2.10	0.00	2.70	7.00	0.00	7.00
K-1	34.91	31.34	3.57	0.00	3.57	8.00	0.00	8.00
F-2	37.12	36.00	1.12	0.00	4.70	9.00	0.00	9.00
A-2	25.66	27.51	-1.85	-4.81	0.00	10.00	10.00	0.00
M11	31.60	32.27	-0.67	0.00	6.19	11.00	0.00	11.00
H-3	40.06	32.03	8.03	0.00	6.73	12.00	0.00	12.00
M10	35.77	29.58	6.19	0.00	7.20	13.00	0.00	13.00
G-2	30.96	28.26	2.70	0.00	8.03	14.00	0.00	14.00

MEAN A: 34.72 STD DEV A: 4.24 SUM OF N MINUS: 17.00 -----
MEAN B: 32.06 STD DEV B: 2.92 SUM OF N PLUS : ------ 38.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: H MIN
FUNCTION B = G: 10 CELL: J MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	-1.89	-1.65	-0.24	-0.10	0.00	1.00	1.00	0.00
H-4	-2.55	-2.13	-0.42	-0.24	0.00	2.00	2.00	0.00
M13	-3.41	-1.46	-1.95	-0.26	0.00	3.00	3.00	0.00
A-3	-5.23	-3.41	-1.82	-0.31	0.00	4.00	4.00	0.00
G-3	-5.03	-4.08	-0.95	-0.42	0.00	5.00	5.00	0.00
M-2	-5.57	-5.26	-0.31	-0.42	0.00	6.00	6.00	0.00
S-3	-4.36	-3.44	-0.92	-0.58	0.00	7.00	7.00	0.00
K-1	-4.93	-4.35	-0.58	-0.92	0.00	8.00	8.00	0.00
F-2	-2.94	-2.52	-0.42	-0.95	0.00	9.00	9.00	0.00
A-2	-4.43	-4.33	-0.10	-1.01	0.00	10.00	10.00	0.00
M11	-4.45	-3.40	-1.05	-1.05	0.00	11.00	11.00	0.00
H-3	-3.94	-2.93	-1.01	-1.53	0.00	12.00	12.00	0.00
M10	-3.55	-3.29	-0.26	-1.82	0.00	13.00	13.00	0.00
G-2	-4.62	-3.09	-1.53	-1.95	0.00	14.00	14.00	0.00

MEAN A: -4.06 STD DEV A: 1.07 SUM OF N MINUS: 105.00 -------
MEAN B: -3.24 STD DEV B: 1.07 SUM OF N PLUS : ------- 0.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	2.17	2.80	-0.63	0.00	0.02	1.00	0.00	1.00
H-4	4.88	5.30	-0.42	-0.17	0.00	2.00	2.00	0.00
M13	1.13	3.36	-2.23	0.00	0.17	3.00	0.00	3.00
A-3	0.58	2.26	-1.68	-0.42	0.00	4.00	4.00	0.00
G-3	2.52	3.14	-0.62	0.00	0.44	5.00	0.00	5.00
M-2	1.12	1.57	-0.45	-0.45	0.00	6.00	6.00	0.00
S-3	0.76	1.90	-1.14	-0.52	0.00	7.00	7.00	0.00
K-1	1.34	1.51	-0.17	-0.62	0.00	8.00	8.00	0.00
F-2	3.03	3.01	0.02	-0.63	0.00	9.00	9.00	0.00
A-2	0.57	0.40	0.17	0.00	0.85	10.00	0.00	10.00
M11	1.48	2.35	-0.87	-0.87	0.00	11.00	11.00	0.00
H-3	3.63	2.78	0.85	-1.14	0.00	12.00	12.00	0.00
M10	1.25	0.81	0.44	-1.68	0.00	13.00	13.00	0.00
G-2	0.60	1.12	-0.52	-2.23	0.00	14.00	14.00	0.00

MEAN A: 1.79 STD DEV A: 1.30 SUM OF N MINUS: 86.00 -------
MEAN B: 2.31 STD DEV B: 1.25 SUM OF N PLUS : ------- 19.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD Z

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	13.18	12.25	0.93	0.00	0.14	1.00	0.00	1.00
H-4	13.66	13.11	0.55	0.00	0.14	2.00	0.00	2.00
M13	13.31	13.17	0.14	-0.36	0.00	3.00	3.00	0.00
A-3	11.85	12.50	-0.65	-0.37	0.00	4.00	4.00	0.00
G-3	12.98	11.64	1.34	0.00	0.43	5.00	0.00	5.00
M-2	11.80	10.90	0.90	0.00	0.55	6.00	0.00	6.00
S-3	14.34	13.21	1.13	-0.65	0.00	7.00	7.00	0.00
K-1	13.45	12.70	0.75	0.00	0.75	8.00	0.00	8.00
F-2	13.13	13.50	-0.37	0.00	0.78	9.00	0.00	9.00
A-2	13.81	12.95	0.86	0.00	0.86	10.00	0.00	10.00
M11	13.15	12.72	0.43	0.00	0.90	11.00	0.00	11.00
H-3	11.59	10.81	0.78	0.00	0.93	12.00	0.00	12.00
M10	14.19	14.05	0.14	0.00	1.13	13.00	0.00	13.00
G-2	12.70	13.06	-0.36	0.00	1.34	14.00	0.00	14.00

MEAN A: 13.08 STD DEV A: 0.85 SUM OF N MINUS: 14.00 -------
MEAN B: 12.61 STD DEV B: 0.94 SUM OF N PLUS : ------- 91.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD RES

FUNCTION A = G: 10 CELL: H ABS
FUNCTION B = G: 10 CELL: J ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	13.26	12.56	0.70	-0.16	0.00	1.50	1.50	0.00
H-4	14.48	14.00	0.48	0.00	0.16	1.50	0.00	1.50
M13	13.46	13.62	-0.16	-0.18	0.00	3.00	3.00	0.00
A-3	12.07	12.73	-0.66	0.00	0.33	4.00	0.00	4.00
G-3	13.34	12.11	1.23	-0.37	0.00	5.00	5.00	0.00
M-2	11.85	10.95	0.90	0.00	0.48	6.00	0.00	6.00
S-3	14.36	13.43	0.93	-0.66	0.00	7.00	7.00	0.00
K-1	13.50	12.75	0.75	0.00	0.70	8.00	0.00	8.00
F-2	13.48	13.85	-0.37	0.00	0.75	9.00	0.00	9.00
A-2	13.97	13.12	0.85	0.00	0.78	10.00	0.00	10.00
M11	13.17	12.84	0.33	0.00	0.85	11.00	0.00	11.00
H-3	11.95	11.17	0.78	0.00	0.90	12.00	0.00	12.00
M10	14.23	14.07	0.16	0.00	0.93	13.00	0.00	13.00
G-2	12.90	13.08	-0.18	0.00	1.23	14.00	0.00	14.00

MEAN A: 13.29 STD DEV A: 0.86 SUM OF N MINUS: 16.50 -------
MEAN B: 12.88 STD DEV B: 0.96 SUM OF N PLUS : ------- 88.50

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REFL

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	92.82	70.89	21.93	-7.14	0.00	1.00	1.00	0.00
H-4	67.10	77.13	-10.03	-10.03	0.00	2.00	2.00	0.00
M13	87.41	64.62	22.79	0.00	11.10	3.00	0.00	3.00
A-3	82.90	55.91	26.99	0.00	14.56	4.00	0.00	4.00
G-3	105.09	75.18	29.91	0.00	16.65	5.00	0.00	5.00
M-2	78.79	62.14	16.65	0.00	18.46	6.00	0.00	6.00
S-3	78.17	55.55	22.62	0.00	21.93	7.00	0.00	7.00
K-1	80.19	51.57	28.62	0.00	22.62	8.00	0.00	8.00
F-2	85.89	56.95	28.94	0.00	22.79	9.00	0.00	9.00
A-2	95.77	62.56	33.21	0.00	26.99	10.00	0.00	10.00
M11	75.42	64.32	11.10	0.00	28.62	11.00	0.00	11.00
H-3	85.48	92.62	-7.14	0.00	28.94	12.00	0.00	12.00
M10	60.13	45.57	14.56	0.00	29.91	13.00	0.00	13.00
G-2	61.61	43.15	18.46	0.00	33.21	14.00	0.00	14.00

MEAN A: 81.20 STD DEV A: 12.64 SUM OF N MINUS: 3.00 -------
MEAN B: 62.73 STD DEV B: 13.19 SUM OF N PLUS : ------- 102.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CROTCH STRAP

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	99.33	72.94	26.39	0.00	3.35	1.00	0.00	1.00
H-4	137.84	114.29	23.55	-7.11	0.00	2.00	2.00	0.00
M13	172.24	110.81	61.43	-9.43	0.00	3.00	3.00	0.00
A-3	138.25	34.68	103.57	0.00	21.74	4.00	0.00	4.00
G-3	206.71	74.67	132.04	0.00	23.55	5.00	0.00	5.00
M-2	60.71	67.82	-7.11	0.00	25.02	6.00	0.00	6.00
S-3	86.11	61.09	25.02	0.00	26.39	7.00	0.00	7.00
K-1	225.65	112.29	113.36	0.00	46.00	8.00	0.00	8.00
F-2	117.39	126.82	-9.43	0.00	50.85	9.00	0.00	9.00
A-2	138.38	87.53	50.85	0.00	61.43	10.00	0.00	10.00
M11	194.28	126.03	68.25	0.00	68.25	11.00	0.00	11.00
H-3	196.24	150.24	46.00	0.00	103.57	12.00	0.00	12.00
M10	87.78	66.04	21.74	0.00	113.36	13.00	0.00	13.00
G-2	98.62	95.27	3.35	0.00	132.04	14.00	0.00	14.00

MEAN A: 139.97 STD DEV A: 51.69 SUM OF N MINUS: 5.00 -------
MEAN B: 92.89 STD DEV B: 31.87 SUM OF N PLUS : ------- 100.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL FOOT Z

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	562.33	439.44	122.89	-4.90	0.00	1.00	1.00	0.00
H-4	539.27	459.18	80.09	-9.56	0.00	2.00	2.00	0.00
M13	525.48	511.56	13.92	0.00	12.02	3.00	0.00	3.00
A-3	370.07	401.21	-31.14	0.00	13.92	4.00	0.00	4.00
G-3	470.79	398.78	72.01	0.00	23.05	5.00	0.00	5.00
M-2	505.76	475.95	29.81	0.00	29.81	6.00	0.00	6.00
S-3	453.24	430.19	23.05	-31.14	0.00	7.00	7.00	0.00
K-1	422.67	384.92	37.75	0.00	37.75	8.00	0.00	8.00
F-2	531.05	535.95	-4.90	0.00	42.41	9.00	0.00	9.00
A-2	400.11	355.16	44.95	0.00	44.95	10.00	0.00	10.00
M11	387.92	375.90	12.02	0.00	72.01	11.00	0.00	11.00
H-3	615.47	573.06	42.41	0.00	80.09	12.00	0.00	12.00
M10	421.67	510.26	-88.59	-88.59	0.00	13.00	13.00	0.00
G-2	335.93	345.49	-9.56	0.00	122.89	14.00	0.00	14.00

MEAN A: 467.27 STD DEV A: 81.76 SUM OF N MINUS: 23.00 -------
MEAN B: 442.65 STD DEV B: 70.77 SUM OF N PLUS : ------- 82.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CARRIAGE VEL

FUNCTION A = G: 10 CELL: C MIN
FUNCTION B = G: 10 CELL: J MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	-25.96	-26.21	0.25	0.00	0.07	1.00	0.00	1.00
M13	-25.96	-26.16	0.20	0.00	0.20	2.00	0.00	2.00
A-3	-25.55	-26.17	0.62	0.00	0.25	3.00	0.00	3.00
G-3	-25.85	-26.30	0.45	0.00	0.26	4.00	0.00	4.00
M-2	-25.85	-26.11	0.26	0.00	0.43	5.00	0.00	5.00
S-3	-25.55	-26.22	0.67	0.00	0.45	6.00	0.00	6.00
K-1	-25.63	-26.19	0.56	0.00	0.52	7.00	0.00	7.00
F-2	-26.04	-26.11	0.07	0.00	0.54	8.00	0.00	8.00
A-2	-25.67	-26.19	0.52	0.00	0.56	9.00	0.00	9.00
M11	-25.64	-26.07	0.43	0.00	0.57	10.00	0.00	10.00
M10	-25.64	-26.18	0.54	0.00	0.62	11.00	0.00	11.00
G-2	-25.62	-26.19	0.57	0.00	0.67	12.00	0.00	12.00

MEAN A: -25.75 STD DEV A: 0.17 SUM OF N MINUS: 0.00 -------
MEAN B: -26.18 STD DEV B: 0.06 SUM OF N PLUS : ------- 78.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST X

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	3.03	1.57	1.46	0.00	0.46	1.00	0.00	1.00
M13	3.36	2.79	0.57	0.00	0.57	2.50	0.00	2.50
A-3	5.12	2.70	2.42	0.00	0.57	2.50	0.00	2.50
G-3	5.09	4.45	0.64	0.00	0.61	4.00	0.00	4.00
M-2	1.93	1.32	0.61	0.00	0.64	5.00	0.00	5.00
S-3	3.97	3.09	0.88	0.00	0.88	6.00	0.00	6.00
K-1	6.35	5.89	0.46	0.00	1.46	7.00	0.00	7.00
F-2	3.68	1.87	1.81	0.00	1.81	8.00	0.00	8.00
A-2	5.69	3.79	1.90	0.00	1.90	9.00	0.00	9.00
M11	3.76	3.19	0.57	0.00	2.29	10.00	0.00	10.00
M10	5.16	1.80	3.36	0.00	2.42	11.00	0.00	11.00
G-2	3.85	1.56	2.29	0.00	3.36	12.00	0.00	12.00

MEAN A: 4.25 STD DEV A: 1.25 SUM OF N MINUS: 0.00 -------
MEAN B: 2.84 STD DEV B: 1.37 SUM OF N PLUS : ------- 76.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST Z

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	19.12	16.14	2.98	0.00	0.36	1.00	0.00	1.00
M13	25.04	20.97	4.07	-1.26	0.00	2.00	2.00	0.00
A-3	16.92	18.18	-1.26	0.00	1.70	3.00	0.00	3.00
G-3	21.86	19.17	2.69	0.00	2.57	4.00	0.00	4.00
M-2	20.08	19.72	0.36	0.00	2.62	5.00	0.00	5.00
S-3	25.39	17.12	8.27	0.00	2.69	6.00	0.00	6.00
K-1	18.62	16.05	2.57	0.00	2.98	7.00	0.00	7.00
F-2	22.88	19.04	3.84	0.00	3.84	8.00	0.00	8.00
A-2	18.25	13.66	4.59	0.00	4.07	9.00	0.00	9.00
M11	18.77	16.15	2.62	0.00	4.59	10.00	0.00	10.00
M10	17.67	15.97	1.70	0.00	7.96	11.00	0.00	11.00
G-2	22.74	14.78	7.96	0.00	8.27	12.00	0.00	12.00

MEAN A: 20.61 STD DEV A: 2.88 SUM OF N MINUS: 2.00 -------
MEAN B: 17.25 STD DEV B: 2.18 SUM OF N PLUS : ------- 76.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST RES

FUNCTION A = G: 10 CELL: C ABS
FUNCTION B = G: 10 CELL: J ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	19.21	16.15	3.06	0.00	0.31	1.00	0.00	1.00
M13	25.23	21.10	4.13	-1.19	0.00	2.00	2.00	0.00
A-3	17.30	18.49	-1.19	0.00	1.72	3.00	0.00	3.00
G-3	22.29	19.18	3.11	0.00	2.59	4.00	0.00	4.00
M-2	20.15	19.84	0.31	0.00	2.69	5.00	0.00	5.00
S-3	25.49	17.55	7.94	0.00	3.06	6.00	0.00	6.00
K-1	19.23	16.54	2.69	0.00	3.11	7.00	0.00	7.00
F-2	23.17	19.11	4.06	0.00	4.06	8.00	0.00	8.00
A-2	18.75	13.77	4.98	0.00	4.13	9.00	0.00	9.00
M11	19.07	16.48	2.59	0.00	4.98	10.00	0.00	10.00
M10	17.74	16.02	1.72	0.00	7.94	11.00	0.00	11.00
G-2	22.87	14.87	8.00	0.00	8.00	12.00	0.00	12.00

MEAN A: 20.88 STD DEV A: 2.83 SUM OF N MINUS: 2.00 -------
MEAN B: 17.43 STD DEV B: 2.17 SUM OF N PLUS : ------- 76.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST SI

FUNCTION A = G: 10 CELL: C ABS
FUNCTION B = G: 10 CELL: J ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	27.58	33.19	-5.61	0.00	2.10	1.00	0.00	1.00
M13	47.31	36.49	10.82	0.00	2.13	2.00	0.00	2.00
A-3	27.34	31.24	-3.90	-3.90	0.00	3.00	3.00	0.00
G-3	38.79	31.80	6.99	-3.91	0.00	4.00	4.00	0.00
M-2	33.38	37.29	-3.91	0.00	5.48	5.00	0.00	5.00
S-3	43.06	31.95	11.11	-5.61	0.00	6.00	6.00	0.00
K-1	37.60	31.34	6.26	0.00	6.26	7.00	0.00	7.00
F-2	38.10	36.00	2.10	0.00	6.87	8.00	0.00	8.00
A-2	32.99	27.51	5.48	0.00	6.99	9.00	0.00	9.00
M11	39.65	32.27	7.38	0.00	7.38	10.00	0.00	10.00
M10	31.71	29.58	2.13	0.00	10.82	11.00	0.00	11.00
G-2	35.13	28.26	6.87	0.00	11.11	12.00	0.00	12.00

MEAN A: 36.05 STD DEV A: 5.93 SUM OF N MINUS: 13.00 -------
MEAN B: 32.24 STD DEV B: 3.10 SUM OF N PLUS : ------- 65.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: C MIN
FUNCTION B = G: 10 CELL: J MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	-3.95	-1.65	-2.30	-0.14	0.00	1.00	1.00	0.00
M13	-5.38	-1.46	-3.92	-0.16	0.00	2.00	2.00	0.00
A-3	-5.39	-3.41	-1.98	-0.53	0.00	3.00	3.00	0.00
G-3	-6.27	-4.08	-2.19	-0.58	0.00	4.00	4.00	0.00
M-2	-5.99	-5.26	-0.73	-0.73	0.00	5.00	5.00	0.00
S-3	-4.02	-3.44	-0.58	-1.68	0.00	6.00	6.00	0.00
K-1	-6.03	-4.35	-1.68	-1.95	0.00	7.00	7.00	0.00
F-2	-4.47	-2.52	-1.95	-1.98	0.00	8.00	8.00	0.00
A-2	-4.49	-4.33	-0.16	-2.19	0.00	9.00	9.00	0.00
M11	-3.93	-3.40	-0.53	-2.30	0.00	10.00	10.00	0.00
M10	-3.43	-3.29	-0.14	-2.66	0.00	11.00	11.00	0.00
G-2	-5.75	-3.09	-2.66	-3.92	0.00	12.00	12.00	0.00

MEAN A: -4.93 STD DEV A: 0.98 SUM OF N MINUS: 78.00 -------
MEAN B: -3.36 STD DEV B: 1.10 SUM OF N PLUS : ------- 0.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD Z

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	13.56	12.25	1.31	-0.02	0.00	1.00	1.00	0.00
M13	13.15	13.17	-0.02	0.00	0.17	2.00	0.00	2.00
A-3	13.32	12.50	0.82	0.00	0.32	3.00	0.00	3.00
G-3	13.02	11.64	1.38	-0.39	0.00	4.00	4.00	0.00
M-2	11.31	10.90	0.41	0.00	0.41	5.00	0.00	5.00
S-3	13.69	13.21	0.48	0.00	0.48	6.00	0.00	6.00
K-1	12.31	12.70	-0.39	-0.67	0.00	7.00	7.00	0.00
F-2	14.62	13.50	1.12	0.00	0.82	8.00	0.00	8.00
A-2	14.21	12.95	1.26	0.00	1.12	9.00	0.00	9.00
M11	12.89	12.72	0.17	0.00	1.26	10.00	0.00	10.00
M10	14.37	14.05	0.32	0.00	1.31	11.00	0.00	11.00
G-2	12.39	13.06	-0.67	0.00	1.38	12.00	0.00	12.00

MEAN A: 13.24 STD DEV A: 0.95 SUM OF N MINUS: 12.00 -------
MEAN B: 12.72 STD DEV B: 0.84 SUM OF N PLUS : ------- 66.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD AES

FUNCTION A = G: 10 CELL: C ABS
FUNCTION B = G: 10 CELL: J ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	13.58	12.56	1.02	0.00	0.27	1.00	0.00	1.00
M13	13.21	13.62	-0.41	-0.32	0.00	2.00	2.00	0.00
A-3	13.33	12.73	0.60	-0.41	0.00	3.00	3.00	0.00
G-3	13.03	12.11	0.92	0.00	0.42	4.00	0.00	4.00
M-2	11.63	10.95	0.68	0.00	0.44	5.00	0.00	5.00
S-3	13.87	13.43	0.44	0.00	0.60	6.00	0.00	6.00
K-1	12.43	12.75	-0.32	-0.66	0.00	7.00	7.00	0.00
F-2	14.82	13.85	0.97	0.00	0.68	8.00	0.00	8.00
A-2	14.41	13.12	1.29	0.00	0.92	9.00	0.00	9.00
M11	13.11	12.84	0.27	0.00	0.97	10.00	0.00	10.00
M10	14.49	14.07	0.42	0.00	1.02	11.00	0.00	11.00
G-2	12.42	13.08	-0.66	0.00	1.29	12.00	0.00	12.00

MEAN A: 13.36 STD DEV A: 0.94 SUM OF N MINUS: 12.00 -------
MEAN B: 12.93 STD DEV B: 0.84 SUM OF N PLUS : ------- 66.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REFL

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	134.52	70.89	63.63	0.00	2.65	1.00	0.00	1.00
M13	135.88	64.62	71.26	0.00	20.03	2.00	0.00	2.00
A-3	110.82	55.91	54.91	0.00	27.64	3.00	0.00	3.00
G-3	119.18	75.18	44.00	0.00	28.64	4.00	0.00	4.00
M-2	142.32	62.14	80.18	0.00	29.25	5.00	0.00	5.00
S-3	107.03	55.55	51.48	0.00	44.00	6.00	0.00	6.00
K-1	80.21	51.57	28.64	0.00	50.99	7.00	0.00	7.00
F-2	107.94	56.95	50.99	0.00	51.48	8.00	0.00	8.00
A-2	65.21	62.56	2.65	0.00	54.91	9.00	0.00	9.00
M11	84.35	64.32	20.03	0.00	63.63	10.00	0.00	10.00
M10	73.21	45.57	27.64	0.00	71.26	11.00	0.00	11.00
G-2	72.40	43.15	29.25	0.00	80.18	12.00	0.00	12.00

MEAN A: 102.76 STD DEV A: 27.14 SUM OF N MINUS: 0.00 -------
MEAN B: 59.03 STD DEV B: 9.53 SUM OF N PLUS : ------- 78.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REEL

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	133.82	104.54	29.28	0.00	1.41	1.00	0.00	1.00
M13	130.38	92.01	38.37	-6.73	0.00	2.00	2.00	0.00
A-3	114.87	94.97	19.90	0.00	8.61	3.00	0.00	3.00
G-3	137.25	143.98	-6.73	0.00	8.64	4.00	0.00	4.00
M-2	152.73	91.14	61.59	0.00	16.35	5.00	0.00	5.00
S-3	115.46	99.11	16.35	0.00	19.90	6.00	0.00	6.00
K-1	74.81	42.42	32.39	0.00	29.28	7.00	0.00	7.00
F-2	141.31	104.97	36.34	0.00	32.39	8.00	0.00	8.00
A-2	62.10	60.69	1.41	0.00	36.34	9.00	0.00	9.00
M11	100.75	92.11	8.64	0.00	38.37	10.00	0.00	10.00
M10	71.71	63.10	8.61	0.00	47.58	11.00	0.00	11.00
G-2	98.47	50.89	47.58	0.00	61.59	12.00	0.00	12.00

MEAN A: 111.14 STD DEV A: 29.83 SUM OF N MINUS: 2.00 -------
MEAN B: 86.66 STD DEV B: 28.14 SUM OF N PLUS : ------- 76.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHOULDER

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	259.04	163.51	95.53	0.00	6.55	1.00	0.00	1.00
M13	265.70	152.83	112.87	0.00	16.71	2.00	0.00	2.00
A-3	224.50	146.42	78.08	0.00	27.05	3.00	0.00	3.00
G-3	256.32	218.04	38.28	0.00	38.28	4.00	0.00	4.00
M-2	292.51	145.14	147.37	0.00	55.29	5.00	0.00	5.00
S-3	209.19	141.28	67.91	0.00	67.91	6.00	0.00	6.00
K-1	137.30	82.01	55.29	0.00	78.08	7.00	0.00	7.00
F-2	240.70	161.82	78.88	0.00	78.88	8.00	0.00	8.00
A-2	120.70	114.15	6.55	0.00	79.58	9.00	0.00	9.00
M11	170.31	153.60	16.71	0.00	95.53	10.00	0.00	10.00
M10	133.52	106.47	27.05	0.00	112.87	11.00	0.00	11.00
G-2	167.12	87.54	79.58	0.00	147.37	12.00	0.00	12.00

MEAN A: 206.41 STD DEV A: 58.76 SUM OF N MINUS: 0.00 -------
MEAN B: 139.40 STD DEV B: 37.47 SUM OF N PLUS : ------- 78.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL LAP

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	131.86	130.30	1.56	0.00	0.98	1.00	0.00	1.00
M13	59.03	123.33	-64.30	0.00	1.56	2.00	0.00	2.00
A-3	125.24	128.26	-3.02	-3.02	0.00	3.00	3.00	0.00
G-3	103.27	108.63	-5.36	-3.73	0.00	4.00	4.00	0.00
M-2	91.44	102.44	-11.00	0.00	4.93	5.00	0.00	5.00
S-3	101.50	112.84	-11.34	-5.36	0.00	6.00	6.00	0.00
K-1	102.82	90.49	12.33	-11.00	0.00	7.00	7.00	0.00
F-2	62.81	101.53	-38.72	-11.34	0.00	8.00	8.00	0.00
A-2	73.47	68.54	4.93	0.00	12.33	9.00	0.00	9.00
M11	80.26	83.99	-3.73	-12.51	0.00	10.00	10.00	0.00
M10	69.12	81.63	-12.51	-38.72	0.00	11.00	11.00	0.00
G-2	54.69	53.71	0.98	-64.30	0.00	12.00	12.00	0.00

MEAN A: 87.96 STD DEV A: 25.53 SUM OF N MINUS: 61.00 -------
MEAN B: 98.81 STD DEV B: 23.95 SUM OF N PLUS : ------- 17.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SEAT Z

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	1664.52	1729.73	-65.21	-11.52	0.00	1.00	1.00	0.00
M13	1665.83	1730.94	-65.11	0.00	39.32	2.00	0.00	2.00
A-3	1554.18	1692.53	-138.35	-46.21	0.00	3.00	3.00	0.00
G-3	1841.30	1911.88	-70.58	-65.11	0.00	4.00	4.00	0.00
M-2	1665.17	1848.46	-183.29	-65.21	0.00	5.00	5.00	0.00
S-3	1689.28	1869.22	-179.94	-70.58	0.00	6.00	6.00	0.00
K-1	2064.17	2207.06	-142.89	0.00	81.05	7.00	0.00	7.00
F-2	1706.14	1625.09	81.05	-83.03	0.00	8.00	8.00	0.00
A-2	1579.04	1590.56	-11.52	-138.35	0.00	9.00	9.00	0.00
M11	1760.95	1843.98	-83.03	-142.89	0.00	10.00	10.00	0.00
M10	1612.33	1658.54	-46.21	-179.94	0.00	11.00	11.00	0.00
G-2	1329.03	1289.71	39.32	-183.29	0.00	12.00	12.00	0.00

MEAN A: 1677.66 STD DEV A: 174.59 SUM OF N MINUS: 69.00 -------
MEAN B: 1749.81 STD DEV B: 220.16 SUM OF N PLUS : ------- 9.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: RFS SEAT FORCE

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	1690.93	1757.83	-66.90	-14.41	0.00	1.00	1.00	0.00
M13	1702.18	1768.31	-66.13	0.00	36.33	2.00	0.00	2.00
A-3	1570.47	1708.57	-138.10	-55.42	0.00	3.00	3.00	0.00
G-3	1861.29	1928.46	-67.17	-66.13	0.00	4.00	4.00	0.00
M-2	1686.06	1868.93	-182.87	-66.90	0.00	5.00	5.00	0.00
S-3	1716.92	1893.47	-176.55	-67.17	0.00	6.00	6.00	0.00
K-1	2099.55	2236.08	-136.53	-75.46	0.00	7.00	7.00	0.00
F-2	1754.69	1670.77	83.92	0.00	83.92	8.00	0.00	8.00
A-2	1587.72	1602.13	-14.41	-136.53	0.00	9.00	9.00	0.00
M11	1789.99	1865.45	-75.46	-138.10	0.00	10.00	10.00	0.00
M10	1634.33	1689.75	-55.42	-176.55	0.00	11.00	11.00	0.00
G-2	1338.79	1302.46	36.33	-182.87	0.00	12.00	12.00	0.00

MEAN A: 1702.74 STD DEV A: 181.25 SUM OF N MINUS: 68.00 -------
MEAN B: 1774.35 STD DEV B: 222.23 SUM OF N PLUS : ------- 10.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL FOOT X

FUNCTION A = G: 10 CELL: C MIN
FUNCTION B = G: 10 CELL: J MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	-363.74	-344.47	-19.27	0.00	14.09	1.00	0.00	1.00
M13	-414.06	-432.35	18.29	0.00	18.29	2.00	0.00	2.00
A-3	-300.25	-323.91	23.66	-19.27	0.00	3.00	3.00	0.00
G-3	-337.72	-282.17	-55.55	0.00	20.82	4.00	0.00	4.00
M-2	-312.88	-333.70	20.82	0.00	23.66	5.00	0.00	5.00
S-3	-282.10	-202.36	-79.74	-33.13	0.00	6.00	6.00	0.00
K-1	296.95	-263.82	-33.13	-55.55	0.00	7.00	7.00	0.00
F-2	-425.15	-350.08	-75.07	-59.79	0.00	8.00	8.00	0.00
A-2	-495.03	-296.78	-198.25	-66.37	0.00	9.00	9.00	0.00
M11	-334.84	-275.05	-59.79	-75.07	0.00	10.00	10.00	0.00
M10	-353.10	-286.73	-66.37	-79.74	0.00	11.00	11.00	0.00
G-2	-246.99	-261.08	14.09	-198.25	0.00	12.00	12.00	0.00

MEAN A: -346.90 STD DEV A: 69.50 SUM OF N MINUS: 66.00 -------
MEAN B: 304.38 STD DEV B: 57.97 SUM OF N PLUS : ------- 12.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: RES FOOT FORCE

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	515.42	468.63	46.79	-3.29	0.00	1.00	1.00	0.00
M13	570.14	639.47	-69.33	-9.34	0.00	2.00	2.00	0.00
A-3	481.05	427.41	53.64	-15.38	0.00	3.00	3.00	0.00
G-3	464.89	480.27	-15.38	0.00	23.82	4.00	0.00	4.00
M-2	504.36	507.65	-3.29	0.00	25.02	5.00	0.00	5.00
S-3	482.06	457.04	25.02	-25.33	0.00	6.00	6.00	0.00
K-1	468.29	402.91	65.38	0.00	46.79	7.00	0.00	7.00
F-2	616.31	592.49	23.82	0.00	53.64	8.00	0.00	8.00
A-2	585.77	451.07	134.70	0.00	64.55	9.00	0.00	9.00
M11	504.75	440.20	64.55	0.00	65.38	10.00	0.00	10.00
M10	515.64	540.97	-25.33	-69.33	0.00	11.00	11.00	0.00
G-2	395.06	404.40	-9.34	0.00	134.70	12.00	0.00	12.00

MEAN A: 508.65 STD DEV A: 59.82 SUM OF N MINUS: 23.00 -------
MEAN B: 484.38 STD DEV B: 73.75 SUM OF N PLUS : ------- 55.00

WILCOXON ANALYSIS

ANALYSIS OF: CHEST Z

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	21.09	21.87	-0.78	-0.47	0.00	1.00	1.00	0.00
G-2	18.04	14.91	3.13	0.00	0.48	2.00	0.00	2.00
F-2	16.98	16.31	0.67	-0.65	0.00	3.00	3.00	0.00
K-1	16.46	15.98	0.48	0.00	0.67	4.00	0.00	4.00
M13	20.47	16.55	3.92	-0.78	0.00	5.00	5.00	0.00
A-2	17.05	15.32	1.73	-0.83	0.00	6.00	6.00	0.00
A-3	20.70	21.53	-0.83	0.00	0.84	7.00	0.00	7.00
F-4	15.01	15.66	-0.65	0.00	1.43	8.00	0.00	8.00
H-3	19.09	17.56	1.53	0.00	1.53	9.00	0.00	9.00
S-3	18.24	16.44	1.80	0.00	1.73	10.00	0.00	10.00
M10	20.24	16.25	3.99	0.00	1.80	11.00	0.00	11.00
F-3	15.64	16.11	-0.47	0.00	1.89	12.00	0.00	12.00
M11	18.27	16.84	1.43	0.00	3.13	13.00	0.00	13.00
M-2	20.55	18.66	1.89	0.00	3.92	14.00	0.00	14.00
H-4	17.19	16.35	0.84	0.00	3.99	15.00	0.00	15.00

MEAN A: 18.33 STD DEV A: 1.96 SUM OF N MINUS: 15.00 -------
MEAN B: 17.09 STD DEV B: 2.07 SUM OF N PLUS : ------- 105.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST RES

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	21.13	22.06	-0.93	-0.46	0.00	1.00	1.00	0.00
G-2	18.11	14.94	3.17	-0.62	0.00	2.00	2.00	0.00
F-2	17.63	16.57	1.06	-0.82	0.00	3.00	3.00	0.00
K-1	17.26	16.43	0.83	0.00	0.83	4.00	0.00	4.00
M13	20.64	16.69	3.95	0.00	0.85	5.00	0.00	5.00
A-2	17.34	15.53	1.81	-0.93	0.00	6.00	6.00	0.00
A-3	21.10	21.72	-0.62	0.00	1.06	7.00	0.00	7.00
F-4	15.35	16.17	-0.82	0.00	1.16	8.00	0.00	8.00
H-3	19.33	17.98	1.35	0.00	1.35	9.00	0.00	9.00
S-3	18.69	16.87	1.82	0.00	1.81	10.00	0.00	10.00
M10	20.38	16.63	3.75	0.00	1.81	11.00	0.00	11.00
F-3	15.73	16.19	-0.46	0.00	1.82	12.00	0.00	12.00
M11	18.36	17.20	1.16	0.00	3.17	13.00	0.00	13.00
M-2	20.56	18.75	1.81	0.00	3.75	14.00	0.00	14.00
H-4	17.40	16.55	0.85	0.00	3.95	15.00	0.00	15.00

MEAN A: 18.60 STD DEV A: 1.88 SUM OF N MINUS: 12.00 -------
MEAN B: 17.35 STD DEV B: 2.05 SUM OF N PLUS : ------- 108.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST SI

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	38.53	42.59	-4.06	0.00	0.02	1.00	0.00	1.00
G-2	30.96	28.03	2.93	-0.40	0.00	2.00	2.00	0.00
F-2	37.12	36.38	0.74	0.00	0.66	3.00	0.00	3.00
K-1	34.91	35.31	-0.40	0.00	0.74	4.00	0.00	4.00
M13	37.05	29.09	7.96	-2.75	0.00	5.00	5.00	0.00
A-2	25.66	28.41	-2.75	0.00	2.77	6.00	0.00	6.00
A-3	38.44	35.67	2.77	0.00	2.93	7.00	0.00	7.00
F-4	30.28	29.62	0.66	0.00	3.21	8.00	0.00	8.00
H-3	40.06	36.85	3.21	0.00	3.29	9.00	0.00	9.00
S-3	34.05	30.76	3.29	-3.87	0.00	10.00	10.00	0.00
M10	35.77	31.63	4.14	-4.06	0.00	11.00	11.00	0.00
F-3	28.38	28.36	0.02	0.00	4.14	12.00	0.00	12.00
M11	31.60	35.47	-3.87	0.00	6.31	13.00	0.00	13.00
M-2	39.00	32.05	6.95	0.00	6.95	14.00	0.00	14.00
H-4	34.58	28.27	6.31	0.00	7.96	15.00	0.00	15.00

MEAN A: 34.43 STD DEV A: 4.25 SUM OF N MINUS: 26.00 -------
MEAN B: 32.57 STD DEV B: 4.29 SUM OF N PLUS : ------- 92.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: H MIN
FUNCTION B = G: 10 CELL: G MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	-5.03	-4.57	-0.46	-0.09	0.00	1.00	1.00	0.00
G-2	-4.62	-3.35	-1.27	-0.31	0.00	2.00	2.00	0.00
F-2	-2.94	-2.85	-0.09	-0.42	0.00	3.00	3.00	0.00
K-1	-4.93	-4.46	-0.47	-0.46	0.00	5.00	5.00	0.00
M13	-3.41	-2.31	-1.10	-0.46	0.00	5.00	5.00	0.00
A-2	-4.43	-4.12	-0.31	-0.46	0.00	5.00	5.00	0.00
A-3	-5.23	-3.95	-1.28	-0.47	0.00	7.00	7.00	0.00
F-4	-4.11	-3.65	-0.46	-0.59	0.00	8.00	8.00	0.00
H-3	-3.94	-2.92	-1.02	-1.00	0.00	9.50	9.50	0.00
S-3	-4.36	-2.88	-1.48	-1.00	0.00	9.50	9.50	0.00
M10	-3.55	-2.55	-1.00	-1.02	0.00	11.00	11.00	0.00
F-3	-1.89	-1.43	-0.46	-1.10	0.00	12.00	12.00	0.00
M11	-4.45	-3.86	-0.59	-1.27	0.00	13.00	13.00	0.00
M-2	-5.57	-5.15	-0.42	-1.28	0.00	14.00	14.00	0.00
H-4	-2.55	-1.55	-1.00	-1.48	0.00	15.00	15.00	0.00

MEAN A: -4.07 STD DEV A: 1.03 SUM OF N MINUS: 120.00 -------
MEAN B: -3.31 STD DEV B: 1.09 SUM OF N PLUS : ------- 0.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD Z

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	12.98	11.80	1.18	0.00	0.03	1.00	0.00	1.00
G-2	12.70	12.40	0.30	0.00	0.22	2.00	0.00	2.00
F-2	13.13	13.10	0.03	0.00	0.23	3.00	0.00	3.00
K-1	13.45	11.22	2.23	0.00	0.30	4.00	0.00	4.00
M13	13.31	12.76	0.55	0.00	0.34	5.00	0.00	5.00
A-2	13.81	12.82	0.99	-0.35	0.00	6.00	6.00	0.00
A-3	11.85	12.20	-0.35	0.00	0.55	7.00	0.00	7.00
F-4	11.28	13.90	-2.62	0.00	0.88	8.00	0.00	8.00
H-3	11.59	11.37	0.22	0.00	0.89	9.00	0.00	9.00
S-3	14.34	13.46	0.88	0.00	0.99	10.00	0.00	10.00
M10	14.19	12.69	1.50	0.00	1.18	11.00	0.00	11.00
F-3	13.18	11.86	1.32	0.00	1.32	12.00	0.00	12.00
M11	13.15	12.26	0.89	0.00	1.50	13.00	0.00	13.00
M-2	11.80	11.46	0.34	0.00	2.23	14.00	0.00	14.00
H-4	13.66	13.43	0.23	-2.62	0.00	15.00	15.00	0.00

MEAN A: 12.96 STD DEV A: 0.94 SUM OF N MINUS: 21.00 -------
MEAN B: 12.45 STD DEV B: 0.82 SUM OF N PLUS : ------- 99.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD RES

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	13.34	12.17	1.17	0.00	0.12	1.00	0.00	1.00
G-2	12.90	12.43	0.47	0.00	0.19	2.00	0.00	2.00
F-2	13.48	13.36	0.12	-0.36	0.00	3.00	3.00	0.00
K-1	13.50	11.41	2.09	0.00	0.38	4.00	0.00	4.00
M13	13.46	12.94	0.52	0.00	0.47	5.50	0.00	5.50
A-2	13.97	12.92	1.05	0.00	0.47	5.50	0.00	5.50
A-3	12.07	12.43	-0.36	0.00	0.52	7.00	0.00	7.00
F-4	11.30	13.92	-2.62	0.00	0.73	8.00	0.00	8.00
H-3	11.95	11.76	0.19	0.00	0.81	9.00	0.00	9.00
S-3	14.36	13.63	0.73	0.00	1.05	10.00	0.00	10.00
M10	14.23	12.79	1.44	0.00	1.17	11.00	0.00	11.00
F-3	13.26	11.86	1.40	0.00	1.40	12.00	0.00	12.00
M11	13.17	12.36	0.81	0.00	1.44	13.00	0.00	13.00
M-2	11.85	11.47	0.38	0.00	2.09	14.00	0.00	14.00
H-4	14.48	14.01	0.47	-2.62	0.00	15.00	15.00	0.00

MEAN A: 13.15 STD DEV A: 0.97 SUM OF N MINUS: 18.00 -------
MEAN B: 12.63 STD DEV B: 0.84 SUM OF N PLUS : ------- 102.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REFL

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	105.09	68.61	36.48	-1.86	0.00	1.00	1.00	0.00
G-2	61.61	37.22	24.39	-7.76	0.00	2.00	2.00	0.00
F-2	85.89	53.74	32.15	0.00	8.56	3.00	0.00	3.00
K-1	80.19	61.26	18.93	0.00	11.31	4.00	0.00	4.00
M13	87.41	62.45	24.96	0.00	13.55	5.00	0.00	5.00
A-2	95.77	57.47	38.30	0.00	16.33	6.00	0.00	6.00
A-3	82.90	66.57	16.33	0.00	18.93	7.00	0.00	7.00
F-4	58.73	66.49	-7.76	0.00	21.04	8.00	0.00	8.00
H-3	85.48	87.34	-1.86	0.00	21.31	9.00	0.00	9.00
S-3	78.17	57.13	21.04	0.00	23.23	10.00	0.00	10.00
M10	60.13	46.58	13.55	0.00	24.39	11.00	0.00	11.00
F-3	92.82	81.51	11.31	0.00	24.96	12.00	0.00	12.00
M11	75.42	52.19	23.23	0.00	32.15	13.00	0.00	13.00
M-2	78.79	57.48	21.31	0.00	36.48	14.00	0.00	14.00
H-4	67.10	58.54	8.56	0.00	38.30	15.00	0.00	15.00

MEAN A: 79.70 STD DEV A: 13.49 SUM OF N MINUS: 3.00 -------
MEAN B: 60.97 STD DEV B: 12.49 SUM OF N PLUS : ------- 117.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REEL

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	120.84	115.75	5.09	0.00	3.60	1.00	0.00	1.00
G-2	72.28	39.83	32.45	0.00	3.66	2.00	0.00	2.00
F-2	112.85	62.66	50.19	0.00	5.09	3.00	0.00	3.00
K-1	75.83	57.45	18.38	-5.45	0.00	4.00	4.00	0.00
M13	95.86	83.32	12.54	-5.62	0.00	5.00	5.00	0.00
A-2	72.24	59.15	13.09	-8.40	0.00	6.00	6.00	0.00
A-3	72.87	78.49	-5.62	-9.22	0.00	7.00	7.00	0.00
F-4	64.24	43.20	21.04	0.00	12.54	8.00	0.00	8.00
H-3	116.98	113.38	3.60	0.00	13.09	9.00	0.00	9.00
S-3	63.60	72.82	-9.22	0.00	14.93	10.00	0.00	10.00
M10	57.09	62.54	-5.45	0.00	18.38	11.00	0.00	11.00
F-3	102.05	110.45	-8.40	0.00	21.04	12.00	0.00	12.00
M11	65.72	62.06	3.66	0.00	32.45	13.00	0.00	13.00
M-2	109.96	69.27	40.69	0.00	40.69	14.00	0.00	14.00
H-4	87.32	72.39	14.93	0.00	50.19	15.00	0.00	15.00

MEAN A: 85.98 STD DEV A: 21.88 SUM OF N MINUS: 22.00 -------
MEAN B: 73.52 STD DEV B: 23.55 SUM OF N PLUS : ------- 98.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHOULDER

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	221.62	184.29	37.33	0.00	0.18	1.00	0.00	1.00
G-2	125.76	75.90	49.86	0.00	1.36	2.00	0.00	2.00
F-2	188.54	116.39	72.15	0.00	1.91	3.00	0.00	3.00
K-1	149.82	109.17	40.65	0.00	3.89	4.00	0.00	4.00
M13	174.82	144.84	29.98	-4.20	0.00	5.00	5.00	0.00
A-2	149.30	108.69	40.61	0.00	18.49	6.00	0.00	6.00
A-3	144.27	142.36	1.91	0.00	24.95	7.00	0.00	7.00
F-4	110.44	106.55	3.89	0.00	29.98	8.00	0.00	8.00
H-3	197.09	178.60	18.49	0.00	31.68	9.00	0.00	9.00
S-3	125.04	123.68	1.36	0.00	37.33	10.00	0.00	10.00
M10	102.11	106.31	-4.20	0.00	40.61	11.00	0.00	11.00
F-3	186.08	185.90	0.18	0.00	40.65	12.00	0.00	12.00
M11	132.17	107.22	24.95	0.00	49.86	13.00	0.00	13.00
M-2	184.46	121.85	62.61	0.00	62.61	14.00	0.00	14.00
H-4	153.48	121.80	31.68	0.00	72.15	15.00	0.00	15.00

MEAN A: 156.33 STD DEV A: 34.61 SUM OF N MINUS: 5.00 -------
MEAN B: 128.90 STD DEV B: 32.29 SUM OF N PLUS : ------- 115.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL LAP

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	70.28	120.59	-50.31	0.00	3.95	1.00	0.00	1.00
G-2	71.58	51.31	20.27	0.00	7.41	2.00	0.00	2.00
F-2	112.72	99.35	13.37	0.00	8.09	3.00	0.00	3.00
K-1	86.52	73.62	12.90	0.00	12.90	4.00	0.00	4.00
M13	101.43	84.98	16.45	0.00	13.37	5.00	0.00	5.00
A-2	107.63	83.00	24.63	0.00	14.99	6.00	0.00	6.00
A-3	114.72	107.31	7.41	0.00	16.45	7.00	0.00	7.00
F-4	109.03	63.65	45.38	0.00	20.27	8.00	0.00	8.00
H-3	64.30	89.02	-24.72	0.00	24.63	9.00	0.00	9.00
S-3	100.13	68.63	31.50	-24.72	0.00	10.00	10.00	0.00
M10	82.59	67.60	14.99	0.00	25.64	11.00	0.00	11.00
F-3	119.18	93.54	25.64	0.00	31.50	12.00	0.00	12.00
M11	72.19	68.24	3.95	0.00	45.03	13.00	0.00	13.00
M-2	114.84	69.81	45.03	0.00	45.38	14.00	0.00	14.00
H-4	120.30	112.21	8.09	-50.31	0.00	15.00	15.00	0.00

MEAN A: 96.50 STD DEV A: 19.93 SUM OF N MINUS: 25.00 -------
MEAN B: 83.52 STD DEV B: 19.95 SUM OF N PLUS : ------- 95.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CROTCH STRAP

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	206.71	46.17	160.54	-3.20	0.00	1.00	1.00	0.00
G-2	98.62	73.26	25.36	0.00	4.99	2.00	0.00	2.00
F-2	117.39	120.59	-3.20	-23.12	0.00	3.00	3.00	0.00
K-1	225.65	144.67	80.98	0.00	23.89	4.00	0.00	4.00
M13	172.24	119.85	52.39	0.00	25.36	5.00	0.00	5.00
A-2	138.38	65.80	72.58	0.00	40.91	6.00	0.00	6.00
A-3	138.25	89.21	49.04	-44.91	0 00	7.00	7.00	0.00
F-4	134.85	93.94	40.91	-45.56	0.00	8.00	8.00	0.00
H-3	196.24	136.90	59.34	0.00	49.04	9.00	0.00	9.00
S-3	86.11	109.23	-23.12	0.00	52.39	10.00	0.00	10.00
M10	87.78	82.79	4.99	0.00	59.34	11.00	0.00	11.00
F-3	99.33	144.89	-45.56	0.00	72.58	12.00	0.00	12.00
M11	194.28	118.66	75.62	0.00	75.62	13.00	0.00	13.00
M-2	60.71	105.62	-44.91	0.00	80.98	14.00	0.00	14.00
H-4	137.84	113.95	23.89	0.00	160.54	15.00	0.00	15.00

MEAN A: 139.63 STD DEV A: 49.83 SUM OF N MINUS: 19.00 -------
MEAN B: 104.37 STD DEV B: 29.03 SUM OF N PLUS : ------- 101.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SEAT Z

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	1798.87	1778.35	20.52	-3.69	0.00	1.00	1.00	0.00
G-2	1295.64	1192.31	103.33	0.00	13.00	2.00	0.00	2.00
F-2	1625.27	1581.65	43.62	0.00	20.52	3.00	0.00	3.00
K-1	2155.03	2158.72	-3.69	-20.58	0.00	4.00	4.00	0.00
M13	1729.38	1716.38	13.00	0.00	21.21	5.00	0.00	5.00
A-2	1601.32	1621.90	-20.58	-26.16	0.00	6.00	6.00	0.00
A-3	1678.47	1657.26	21.21	0.00	37.78	7.00	0.00	7.00
F-4	1652.22	1583.82	68.40	0.00	43.62	8.00	0.00	8.00
H-3	1894.36	1808.15	86.21	0.00	68.40	9.00	0.00	9.00
S-3	1871.18	1897.34	-26.16	0.00	70.00	10.00	0.00	10.00
M10	1698.17	1586.88	111.29	0.00	86.21	11.00	0.00	11.00
F-3	1642.26	1572.26	70.00	0.00	103.33	12.00	0.00	12.00
M11	1773.12	1735.34	37.78	0.00	111.29	13.00	0.00	13.00
M-2	1928.02	1749.54	178.48	0.00	147.51	14.00	0.00	14.00
H-4	2023.30	1875.79	147.51	0.00	178.48	15.00	0.00	15.00

MEAN A: 1757.77 STD DEV A: 203.80 SUM OF N MINUS: 11.00 -------
MEAN B: 1701.05 STD DEV B: 211.18 SUM OF N PLUS : ------- 109.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: RES SEAT FORCE

FUNCTION A = G: 10 CELL: H MAX
FUNCTION B = G: 10 CELL: G MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	1831.66	1797.70	33.96	0.00	9.09	1.00	0.00	1.00
G-2	1308.52	1200.05	108.47	-20.64	0.00	2.00	2.00	0.00
F-2	1675.75	1633.39	42.36	0.00	21.91	3.00	0.00	3.00
K-1	2191.97	2182.88	9.09	0.00	22.74	4.00	0.00	4.00
M13	1765.20	1743.29	21.91	-27.05	0.00	5.00	5.00	0.00
A-2	1609.85	1630.49	-20.64	0.00	33.96	6.00	0.00	6.00
A-3	1695.69	1672.95	22.74	0.00	41.47	7.00	0.00	7.00
F-4	1684.12	1621.16	62.96	0.00	42.36	8.00	0.00	8.00
H-3	1915.36	1827.47	87.89	0.00	62.96	9.00	0.00	9.00
S-3	1895.96	1923.01	-27.05	0.00	76.72	10.00	0.00	10.00
M10	1727.98	1609.17	118.81	0.00	87.89	11.00	0.00	11.00
F-3	1665.94	1589.22	76.72	0.00	108.47	12.00	0.00	12.00
M11	1808.70	1767.23	41.47	0.00	118.81	13.00	0.00	13.00
M-2	1951.28	1776.34	174.94	0.00	156.04	14.00	0.00	14.00
H-4	2052.99	1896.95	156.04	0.00	174.94	15.00	0.00	15.00

MEAN A: 1785.40 STD DEV A: 207.49 SUM OF N MINUS: 7.00 -------
MEAN B: 1724.75 STD DEV B: 213.34 SUM OF N PLUS : ------- 113.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL FOOT X

FUNCTION A = G: 10 CELL: H MIN
FUNCTION B = G: 10 CELL: G MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-3	-302.70	-305.25	2.55	0.00	2.55	1.00	0.00	1.00
G-2	-237.09	-355.25	118.16	-7.28	0.00	2.00	2.00	0.00
F-2	-317.83	-349.93	32.10	-21.03	0.00	3.00	3.00	0.00
K-1	-257.19	-249.91	-7.28	0.00	22.59	4.00	0.00	4.00
M13	-388.32	-367.29	-21.03	-24.71	0.00	5.00	5.00	0.00
A-2	-324.80	-417.13	92.33	0.00	32.10	6.00	0.00	6.00
A-3	-235.18	-305.55	70.37	0.00	56.74	7.00	0.00	7.00
F-4	-247.28	-333.12	85.84	0.00	64.60	8.00	0.00	8.00
H-3	-518.61	-434.90	-83.71	0.00	70.37	9.00	0.00	9.00
S-3	-379.95	-355.24	-24.71	-83.71	0.00	10.00	10.00	0.00
M10	-257.58	-376.39	118.81	0.00	85.84	11.00	0.00	11.00
F-3	-493.77	-558.37	64.60	0.00	92.33	12.00	0.00	12.00
M11	-324.22	-346.81	22.59	0.00	118.16	13.00	0.00	13.00
M-2	-319.14	-375.88	56.74	0.00	118.81	14.00	0.00	14.00
H-4	-468.03	-590.72	122.69	0.00	122.69	15.00	0.00	15.00

MEAN A: -338.11 STD DEV A: 93.52 SUM OF N MINUS: 20.00 -------
MEAN B: -381.45 STD DEV B: 90.34 SUM OF N PLUS : ------- 100.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CARRIAGE VEL

FUNCTION A = G: 10 CELL: C MIN
FUNCTION B = G: 10 CELL: H MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-2	-25.62	-26.19	0.57	0.00	0.03	1.00	0.00	1.00
K-1	-25.63	-26.24	0.61	-0.03	0.00	2.00	2.00	0.00
G-3	-25.85	-25.88	0.03	-0.15	0.00	3.50	3.50	0.00
S-3	-25.55	-26.23	0.68	0.00	0.15	3.50	0.00	3.50
M-2	-25.85	-25.82	-0.03	0.00	0.21	5.00	0.00	5.00
F-2	-26.04	-25.89	-0.15	0.00	0.27	6.00	0.00	6.00
F-3	-25.96	-26.11	0.15	0.00	0.44	7.00	0.00	7.00
M11	-25.64	-26.13	0.49	0.00	0.49	8.00	0.00	8.00
A-3	-25.55	-25.99	0.44	0.00	0.51	9.00	0.00	9.00
M10	-25.64	-26.15	0.51	0.00	0.57	10.00	0.00	10.00
A-2	-25.67	-25.94	0.27	0.00	0.61	11.00	0.00	11.00
M13	-25.96	-26.17	0.21	0.00	0.68	12.00	0.00	12.00

MEAN A: -25.75 STD DEV A: 0.17 SUM OF N MINUS: 5.50 -------
MEAN B: -26.06 STD DEV B: 0.15 SUM OF N PLUS : ------- 72.50

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST X

FUNCTION A = G: 10 CELL: C MIN
FUNCTION B = G: 10 CELL: H MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-2	-2.13	-2.19	0.06	0.00	0.06	1.00	0.00	1.00
K-1	-1.03	-0.64	-0.39	-0.11	0.00	2.00	2.00	0.00
G-3	-1.93	-2.34	0.41	-0.37	0.00	3.00	3.00	0.00
S-3	-2.62	-0.39	-2.23	-0.39	0.00	4.00	4.00	0.00
M-2	-4.10	-3.22	-0.88	0.00	0.41	5.00	0.00	5.00
F-2	-2.56	-1.84	-0.72	-0.50	0.00	6.00	6.00	0.00
F-3	-1.46	-2.12	0.66	0.00	0.66	7.00	0.00	7.00
M11	-3.79	-2.01	-1.78	-0.72	0.00	8.00	8.00	0.00
A-3	-1.98	-1.10	-0.88	-0.88	0.00	9.00	9.00	0.00
M10	-2.17	-2.06	0.11	-0.88	0.00	10.00	10.00	0.00
A-2	-0.79	-0.29	-0.50	-1.78	0.00	11.00	11.00	0.00
M13	-2.01	-1.64	-0.37	-2.23	0.00	12.00	12.00	0.00

MEAN A: -2.21 STD DEV A: 0.98 SUM OF N MINUS: 65.00 -------
MEAN B: -1.65 STD DEV B: 0.88 SUM OF N PLUS : ------- 13.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST Z

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: H MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-2	22.74	18.04	4.70	-0.47	0.00	1.00	1.00	0.00
K-1	18.62	16.46	2.16	0.00	0.50	2.00	0.00	2.00
G-3	21.86	21.09	0.77	0.00	0.77	3.00	0.00	3.00
S-3	25.39	18.24	7.15	0.00	1.20	4.00	0.00	4.00
M-2	20.08	20.55	-0.47	0.00	2.16	5.00	0.00	5.00
F-2	22.88	16.98	5.90	-2.57	0.00	6.00	6.00	0.00
F-3	19.12	15.64	3.48	0.00	3.48	7.00	0.00	7.00
M11	18.77	18.27	0.50	-3.78	0.00	8.00	8.00	0.00
A-3	16.92	20.70	-3.78	0.00	4.57	9.00	0.00	9.00
M10	17.67	20.24	-2.57	0.00	4.70	10.00	0.00	10.00
A-2	18.25	17.05	1.20	0.00	5.90	11.00	0.00	11.00
M13	25.04	20.47	4.57	0.00	7.15	12.00	0.00	12.00

MEAN A: 20.61 STD DEV A: 2.88 SUM OF N MINUS: 15.00 -------
MEAN B: 18.64 STD DEV B: 1.89 SUM OF N PLUS : ------- 63.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST RES

FUNCTION A = G: 10 CELL: C ABS
FUNCTION B = G: 10 CELL: H ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-2	22.87	18.11	4.76	-0.41	0.00	1.00	1.00	0.00
K-1	19.23	17.26	1.97	0.00	0.71	2.00	0.00	2.00
G-3	22.29	21.13	1.16	0.00	1.16	3.00	0.00	3.00
S-3	25.49	18.69	6.80	0.00	1.41	4.00	0.00	4.00
M-2	20.15	20.56	-0.41	0.00	1.97	5.00	0.00	5.00
F-2	23.17	17.63	5.54	-2.64	0.00	6.00	6.00	0.00
F-3	19.21	15.73	3.48	0.00	3.48	7.00	0.00	7.00
M11	19.07	18.36	0.71	-3.80	0.00	8.00	8.00	0.00
A-3	17.30	21.10	-3.80	0.00	4.59	9.00	0.00	9.00
M10	17.74	20.38	-2.64	0.00	4.76	10.00	0.00	10.00
A-2	18.75	17.34	1.41	0.00	5.54	11.00	0.00	11.00
M13	25.23	20.64	4.59	0.00	6.80	12.00	0.00	12.00

MEAN A: 20.88 STD DEV A: 2.83 SUM OF N MINUS: 15.00 -------
MEAN B: 18.91 STD DEV B: 1.80 SUM OF N PLUS : ------- 63.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: C MIN
FUNCTION B = G: 10 CELL: H MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-2	-5.75	-4.62	-1.13	-0.06	0.00	1.00	1.00	0.00
K-1	-6.03	-4.93	-1.10	0.00	0.12	2.00	0.00	2.00
G-3	-6.27	-5.03	-1.24	-0.16	0.00	3.00	3.00	0.00
S-3	-4.02	-4.36	0.34	0.00	0.34	4.00	0.00	4.00
M-2	-5.99	-5.57	-0.42	-0.42	0.00	5.00	5.00	0.00
F-2	-4.47	-2.94	-1.53	0.00	0.52	6.00	0.00	6.00
F-3	-3.95	-1.89	-2.06	-1.10	0.00	7.00	7.00	0.00
M11	-3.93	-4.45	0.52	-1.13	0.00	8.00	8.00	0.00
A-3	-5.39	-5.23	-0.16	-1.24	0.00	9.00	9.00	0.00
M10	-3.43	-3.55	0.12	-1.53	0.00	10.00	10.00	0.00
A-2	-4.49	-4.43	-0.06	-1.97	0.00	11.00	11.00	0.00
M13	-5.38	-3.41	-1.97	-2.06	0.00	12.00	12.00	0.00

MEAN A: -4.93 STD DEV A: 0.98 SUM OF N MINUS: 66.00 -------
MEAN B: -4.20 STD DEV B: 1.06 SUM OF N PLUS : ------- 12.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REFL

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: H MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-2	72.40	61.61	10.79	0.00	0.02	1.00	0.00	1.00
K-1	80.21	80.19	0.02	0.00	8.93	2.00	0.00	2.00
G-3	119.18	105.09	14.09	0.00	10.79	3.00	0.00	3.00
S-3	107.03	78.17	28.86	0.00	13.08	4.00	0.00	4.00
M-2	142.32	78.79	63.53	0.00	14.09	5.00	0.00	5.00
F-2	107.94	85.89	22.05	0.00	22.05	6.00	0.00	6.00
F-3	134.52	92.82	41.70	0.00	27.92	7.00	0.00	7.00
M11	84.35	75.42	8.93	0.00	28.86	8.00	0.00	8.00
A-3	110.82	82.90	27.92	-30.56	0.00	9.00	9.00	0.00
M10	73.21	60.13	13.08	0.00	41.70	10.00	0.00	10.00
A-2	65.21	95.77	-30.56	0.00	48.47	11.00	0.00	11.00
M13	135.88	87.41	48.47	0.00	63.53	12.00	0.00	12.00

MEAN A: 102.76 STD DEV A: 27.14 SUM OF N MINUS: 9.00 -------
MEAN B: 82.02 STD DEV B: 12.97 SUM OF N PLUS : ------- 69.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REEL

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: H MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-2	98.47	72.28	26.19	-1.02	0.00	1.00	1.00	0.00
K-1	74.81	75.83	-1.02	-10.14	0.00	2.00	2.00	0.00
G-3	137.25	120.84	16.41	0.00	14.62	3.00	0.00	3.00
S-3	115.46	63.60	51.86	0.00	16.41	4.00	0.00	4.00
M-2	152.73	109.96	42.77	0.00	26.19	5.00	0.00	5.00
F-2	141.31	112.85	28.46	0.00	28.46	6.00	0.00	6.00
F-3	133.82	102.05	31.77	0.00	31.77	7.00	0.00	7.00
M11	100.75	65.72	35.03	0.00	34.52	8.00	0.00	8.00
A-3	114.87	72.87	42.00	0.00	35.03	9.00	0.00	9.00
M10	71.71	57.09	14.62	0.00	42.00	10.00	0.00	10.00
A-2	62.10	72.24	-10.14	0.00	42.77	11.00	0.00	11.00
M13	130.38	95.86	34.52	0.00	51.86	12.00	0.00	12.00

MEAN A: 111.14 STD DEV A: 29.83 SUM OF N MINUS: 3.00 -------
MEAN B: 85.10 STD DEV B: 21.86 SUM OF N PLUS : ------- 75.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHOULDER

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: H MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-2	167.12	125.76	41.36	-12.52	0.00	1.00	1.00	0.00
K-1	137.30	149.82	-12.52	-28.60	0.00	2.00	2.00	0.00
G-3	256.32	221.62	34.70	0.00	31.41	3.00	[illegible]	[illegible]
S-3	209.19	125.04	84.15	0.00	34.70	4.00	0.00	[illegible]
M-2	292.51	184.46	108.05	0.00	38.14	5.00	0.00	[illegible]
F-2	240.70	188.54	52.16	0.00	41.36	6.00	0.00	[illegible]
F-3	259.04	186.08	72.96	0.00	52.16	7.00	0.00	7.00
M11	170.31	132.17	38.14	0.00	72.96	8.00	0.00	8.00
A-3	224.50	144.27	80.23	0.00	80.23	9.00	0.00	9.00
M10	133.52	102.11	31.41	0.00	84.15	10.00	0.00	10.00
A-2	120.70	149.30	-28.60	0.00	90.88	11.00	0.00	11.00
M13	265.70	174.82	90.88	0.00	108.05	12.00	0.00	12.00

MEAN A: 206.41 STD DEV A: 58.[illegible] SUM OF N MINUS: 3.[illegible]
MEAN B: 157.00 STD DEV B: 54.36 SUM OF N PLUS : [illegible]

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CROTCH STRAP

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: H MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
G-2	41.98	98.62	-56.64	0.00	6.74	1.00	0.00	1.00
K-1	117.28	225.65	-108.37	-8.29	0.00	2.00	2.00	[illegible]
G-3	45.95	206.71	-160.76	-9.76	0.00	3.00	3.00	0.00
S-3	77.82	86.11	-8.29	0.00	30.87	4.00	0.00	4.00
M-2	126.53	60.71	65.82	0.00	38.78	5.00	0.00	5.00
F-2	156.17	117.39	38.78	-56.64	0.00	6.00	6.00	0.00
F-3	89.57	99.33	-9.76	0.00	65.82	7.00	0.00	7.00
M11	48.60	194.28	-145.68	-104.19	0.00	8.00	8.00	0.00
A-3	34.06	138.25	-104.19	-108.37	0.00	9.00	9.00	0.00
M10	118.65	87.78	30.87	-110.18	0.00	10.00	10.00	[illegible]
A-2	28.20	138.38	-110.18	-145.68	0.00	11.00	11.00	[illegible]
M13	178.98	172.24	6.74	-160.76	0.00	12.00	12.00	0.00

MEAN A: 88.65 STD DEV A: 50.[illegible] SUM OF N MINUS [illegible].00
MEAN B: 135.45 STD DEV B: [illegible] SUM OF N PLUS [illegible]

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST X

FUNCTION A = G: 10 CELL: G MIN
FUNCTION B = G: 10 CELL: J MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	-2.67	-2.87	0.20	-0.02	0.00	1.00	1.00	[illegible]
H-4	-2.33	-4.41	2.08	0.00	0.03	2.00	0.00	[illegible]
M13	-2.04	-3.00	0.96	0.00	0.04	3.00	0.00	[illegible]
A-3	-1.39	-2.11	0.72	0.00	0.20	4.00	0.00	[illegible]
G-3	-1.96	-2.79	0.83	-0.29	0.00	5.00	5.00	[illegible]
M-2	-2.51	-3.72	1.21	-0.38	0.00	6.00	6.00	[illegible]
S-3	-1.52	-1.55	0.03	0.00	0.52	7.00	0.00	7.00
K-1	-1.12	-1.16	0.04	0.00	0.62	8.00	0.00	8.00
F-2	-2.19	-3.60	1.41	0.00	0.72	9.00	0.00	9.00
A-2	-1.49	-1.11	-0.38	0.00	0.83	10.00	0.00	[illegible]
M11	-2.30	-2.28	-0.02	0.00	0.96	11.00	0.00	[illegible]
H-3	-3.31	-3.02	-0.29	0.00	1.21	12.00	0.00	12.00
M10	-1.45	-1.97	0.52	0.00	1.41	13.00	0.00	[illegible]
G-2	-2.07	-2.69	0.62	0.00	2.08	14.00	0.00	[illegible]

MEAN A: -2.03 STD DEV A: 0.59 SUM OF N MINUS: 12.00 -------
MEAN B: -2.59 STD DEV B: 0.97 SUM OF N PLUS : ------- 93.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST X

FUNCTION A = G: 10 CELL: G MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	2.07	1.57	0.50	-0.25	0.00	1.00	1.00	0.00
H-4	2.42	1.15	1.27	0.00	0.50	2.00	0.00	2.00
M13	3.49	2.79	0.70	0.00	0.51	3.00	0.00	3.00
A-3	4.13	2.70	1.43	0.00	0.68	4.00	0.00	4.00
G-3	4.20	4.45	-0.25	0.00	0.70	5.00	0.00	5.00
M-2	1.83	1.32	0.51	0.00	0.74	6.00	0.00	6.00
S-3	3.77	3.09	0.68	0.00	1.14	7.00	0.00	7.00
K-1	4.58	5.89	-1.31	0.00	1.27	8.00	0.00	8.00
F-2	3.53	1.87	1.66	-1.31	0.00	9.00	9.00	0.00
A-2	4.93	3.79	1.14	0.00	1.40	10.00	0.00	10.00
M11	3.93	3.19	0.74	0.00	1.43	11.00	0.00	11.00
H-3	4.28	2.29	1.99	0.00	1.66	12.00	0.00	12.00
M10	3.20	1.80	1.40	0.00	1.77	13.00	0.00	13.00
G-2	3.33	1.56	1.77	0.00	1.99	14.00	0.00	14.00

MEAN A: 3.55 STD DEV A: 0.92 SUM OF N MINUS: 10.00 -------
MEAN B: 2.68 STD DEV B: 1.34 SUM OF N PLUS : ------- 95.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: G MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	0.83	2.80	-1.97	-0.03	0.00	1.00	1.00	0.00
H-4	3.96	5.30	-1.34	-0.08	0.00	2.00	2.00	0.00
M13	1.60	3.36	-1.76	0.00	0.19	3.00	0.00	3.00
A-3	0.98	2.26	-1.28	-0.27	0.00	4.50	4.50	0.00
G-3	2.26	3.14	-0.88	0.00	0.27	4.50	0.00	4.50
M-2	1.12	1.57	-0.45	-0.45	0.00	6.00	6.00	0.00
S-3	2.09	1.90	0.19	-0.64	0.00	7.00	7.00	0.00
K-1	1.43	1.51	-0.08	0.00	0.80	8.00	0.00	8.00
F-2	2.74	3.01	-0.27	-0.83	0.00	9.00	9.00	0.00
A-2	0.37	0.40	-0.03	-0.88	0.00	10.00	10.00	0.00
M11	1.52	2.35	-0.83	-1.28	0.00	11.00	11.00	0.00
H-3	3.05	2.78	0.27	-1.34	0.00	12.00	12.00	0.00
M10	1.61	0.81	0.80	-1.76	0.00	13.00	13.00	0.00
G-2	0.48	1.12	-0.64	-1.97	0.00	14.00	14.00	0.00

MEAN A: 1.72 STD DEV A: 1.02 SUM OF N MINUS: 89.50 -------
MEAN B: 2.31 STD DEV B: 1.25 SUM OF N PLUS : ------- 15.50

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD RES

FUNCTION A = G: 10 CELL: G ABS
FUNCTION B = G: 10 CELL: J ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	11.86	12.56	-0.70	0.00	0.01	1.00	0.00	1.00
H-4	14.01	14.00	0.01	0.00	0.06	2.00	0.00	2.00
M13	12.94	13.62	-0.68	0.00	0.20	3.50	0.00	3.50
A-3	12.43	12.73	-0.30	-0.20	0.00	3.50	3.50	0.00
G-3	12.17	12.11	0.06	-0.30	0.00	5.00	5.00	0.00
M-2	11.47	10.95	0.52	-0.48	0.00	6.00	6.00	0.00
S-3	13.63	13.43	0.20	-0.49	0.00	7.00	7.00	0.00
K-1	11.41	12.75	-1.34	0.00	0.52	8.00	0.00	8.00
F-2	13.36	13.85	-0.49	0.00	0.59	9.00	0.00	9.00
A-2	12.92	13.12	-0.20	-0.65	0.00	10.00	10.00	0.00
M11	12.36	12.84	-0.48	-0.68	0.00	11.00	11.00	0.00
H-3	11.76	11.17	0.59	-0.70	0.00	12.00	12.00	0.00
M10	12.79	14.07	-1.28	-1.28	0.00	13.00	13.00	0.00
G-2	12.43	13.08	-0.65	-1.34	0.00	14.00	14.00	0.00

MEAN A: 12.54 STD DEV A: 0.79 SUM OF N MINUS: 81.50 -------
MEAN B: 12.88 STD DEV B: 0.96 SUM OF N PLUS : ------- 23.50

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD SI

FUNCTION A = G: 10 CELL: G MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	16.92	20.15	1.23	0.00	0.00	1.00	0.00	1.00
H-4	22.65	22.97	-0.32	-0.32	0.00	2.00	2.00	0.00
M13	18.29	21.35	-3.06	-0.49	0.00	3.00	3.00	0.00
A-3	17.40	18.18	-0.78	-0.78	0.00	4.00	4.00	0.00
G-3	16.57	18.52	-1.95	-0.85	0.00	5.00	5.00	0.00
M-2	18.64	15.78	2.86	-1.23	0.00	6.00	6.00	0.00
S-3	20.07	19.97	0.10	-1.24	0.00	7.00	7.00	0.00
K-1	16.66	20.12	-3.46	0.00	1.46	8.00	0.00	8.00
F-2	21.32	22.56	-1.24	-1.95	0.00	9.00	9.00	0.00
A-2	21.33	21.82	-0.49	-2.83	0.00	10.00	10.00	0.00
M11	18.62	21.45	-2.83	0.00	2.86	11.00	0.00	11.00
H-3	19.03	19.88	-0.85	-3.06	0.00	12.00	12.00	0.00
M10	22.95	21.49	1.46	-3.25	0.00	13.00	13.00	0.00
G-2	17.74	20.99	-3.25	-3.46	0.00	14.00	14.00	0.00

MEAN A: 19.30 STD DEV A: 2.07 SUM OF N MINUS: 85.00 -------
MEAN B: 20.37 STD DEV B: 1.91 SUM OF N PLUS : ------- 20.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REEL

FUNCTION A = G: 10 CELL: G MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	110.45	104.54	5.91	-0.56	0.00	1.00	1.00	0.00
H-4	72.39	160.41	-88.02	-1.54	0.00	2.00	2.00	0.00
M13	83.32	92.01	-8.69	0.00	5.91	3.00	0.00	3.00
A-3	78.49	94.97	-16.48	-8.69	0.00	4.00	4.00	0.00
G-3	115.75	143.98	-28.23	-11.06	0.00	5.00	5.00	0.00
M-2	69.27	91.14	-21.87	-11.25	0.00	6.00	6.00	0.00
S-3	72.82	99.11	-26.29	0.00	15.03	7.00	0.00	7.00
K-1	57.45	42.42	15.03	-16.48	0.00	8.00	8.00	0.00
F-2	62.66	104.97	-42.31	-21.87	0.00	9.00	9.00	0.00
A-2	59.15	60.69	-1.54	-26.29	0.00	10.00	10.00	0.00
M11	62.06	92.11	-30.05	-28.23	0.00	11.00	11.00	0.00
H-3	113.38	124.63	-11.25	-30.05	0.00	12.00	12.00	0.00
M10	62.54	63.10	-0.56	-42.31	0.00	13.00	13.00	0.00
G-2	39.83	50.89	-11.06	-88.02	0.00	14.00	14.00	0.00

MEAN A: 75.68 STD DEV A: 22.84 SUM OF N MINUS: 95.00 -------
MEAN B: 94.64 STD DEV B: 33.62 SUM OF N PLUS : ------- 10.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHOULDER

FUNCTION A = G: 10 CELL: G MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	185.90	163.51	22.39	-0.16	0.00	1.00	1.00	0.00
H-4	121.80	236.08	-114.28	-4.06	0.00	2.00	2.00	0.00
M13	144.84	152.83	-7.99	-5.46	0.00	3.00	3.00	0.00
A-3	142.36	146.42	-4.06	-7.99	0.00	4.00	4.00	0.00
G-3	184.29	218.04	-33.75	-11.64	0.00	5.00	5.00	0.00
M-2	121.85	145.14	-23.29	-16.66	0.00	6.00	6.00	0.00
S-3	123.68	141.28	-17.60	-17.60	0.00	7.00	7.00	0.00
K-1	109.17	82.01	27.16	0.00	22.39	8.00	0.00	8.00
F-2	116.39	161.82	-45.43	-23.29	0.00	9.00	9.00	0.00
A-2	108.69	114.15	-5.46	0.00	27.16	10.00	0.00	10.00
M11	107.22	153.60	-46.38	-33.75	0.00	11.00	11.00	0.00
H-3	178.60	195.26	-16.66	-45.43	0.00	12.00	12.00	0.00
M10	106.31	106.47	-0.16	-46.38	0.00	13.00	13.00	0.00
G-2	75.90	87.54	-11.64	-114.28	0.00	14.00	14.00	0.00

MEAN A: 130.50 STD DEV A: 32.88 SUM OF N MINUS: 87.00 -------
MEAN B: 150.30 STD DEV B: 44.93 SUM OF N PLUS : ------- 18.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL LAP

FUNCTION A = G: 10 CELL: G MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	93.54	130.30	-36.76	-2.18	0.00	1.00	1.00	0.00
H-4	112.21	151.07	-38.86	-2.40	0.00	2.00	2.00	0.00
M13	84.98	123.33	-38.35	0.00	4.73	3.00	0.00	3.00
A-3	107.31	128.26	-20.95	0.00	11.96	4.00	0.00	4.00
G-3	120.59	108.63	11.96	-14.03	0.00	5.00	5.00	0.00
M-2	69.81	102.44	-32.63	0.00	14.46	6.00	0.00	6.00
S-3	68.63	112.84	-44.21	-15.75	0.00	7.00	7.00	0.00
K-1	73.62	90.49	-16.87	-16.87	0.00	8.00	8.00	0.00
F-2	99.35	101.53	-2.18	-20.95	0.00	9.00	9.00	0.00
A-2	83.00	68.54	14.46	-32.63	0.00	10.00	10.00	0.00
M11	68.24	83.99	-15.75	-36.76	0.00	11.00	11.00	0.00
H-3	89.02	84.29	4.73	-38.35	0.00	12.00	12.00	0.00
M10	67.60	81.63	-14.03	-38.86	0.00	13.00	13.00	0.00
G-2	51.31	53.71	-2.40	-44.21	0.00	14.00	14.00	0.00

MEAN A: 84.94 STD DEV A: 19.90 SUM OF N MINUS: 92.00 -------
MEAN B: 101.50 STD DEV B: 26.53 SUM OF N PLUS : ------- 13.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SEAT Z

FUNCTION A = G: 10 CELL: G MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	1572.26	1729.73	-157.47	-14.56	0.00	1.00	1.00	0.00
H-4	1875.79	2024.12	-148.33	0.00	28.12	2.00	0.00	2.00
M13	1716.38	1730.94	-14.56	0.00	31.34	3.00	0.00	3.00
A-3	1657.26	1692.53	-35.27	-35.27	0.00	4.00	4.00	0.00
G-3	1778.35	1911.88	-133.53	-43.44	0.00	5.00	5.00	0.00
M-2	1749.54	1848.46	-98.92	-48.34	0.00	6.00	6.00	0.00
S-3	1897.34	1869.22	28.12	0.00	62.78	7.00	0.00	7.00
K-1	2158.72	2207.06	-48.34	-71.66	0.00	8.00	8.00	0.00
F-2	1581.65	1625.09	-43.44	-97.40	0.00	9.00	9.00	0.00
A-2	1621.90	1590.56	31.34	-98.92	0.00	10.00	10.00	0.00
M11	1735.34	1843.98	-108.64	-108.64	0.00	11.00	11.00	0.00
H-3	1808.15	1745.37	62.78	-133.53	0.00	12.00	12.00	0.00
M10	1586.88	1658.54	-71.66	-148.33	0.00	13.00	13.00	0.00
G-2	1192.31	1289.71	-97.40	-157.47	0.00	14.00	14.00	0.00

MEAN A: 1709.42 STD DEV A: 216.55 SUM OF N MINUS: 93.00 -------
MEAN B: 1769.09 STD DEV B: 215.41 SUM OF N PLUS : ------- 12.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: RES SEAT FORCE

FUNCTION A = G: 10 CELL: G MAX
FUNCTION B = G: 10 CELL: J MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	1589.22	1757.83	-168.61	-25.02	0.00	1.00	1.00	0.00
H-4	1896.95	2046.64	-149.69	0.00	28.36	2.00	0.00	2.00
M13	1743.29	1768.31	-25.02	0.00	29.54	3.00	0.00	3.00
A-3	1672.95	1708.57	-35.62	-35.62	0.00	4.00	4.00	0.00
G-3	1797.70	1928.46	-130.76	-37.38	0.00	5.00	5.00	0.00
M-2	1776.34	1868.93	-92.59	-53.20	0.00	6.00	6.00	0.00
S-3	1923.01	1893.47	29.54	0.00	66.60	7.00	0.00	7.00
K-1	2182.88	2236.08	-53.20	-80.58	0.00	8.00	8.00	0.00
F-2	1633.39	1670.77	-37.38	-92.59	0.00	9.00	9.00	0.00
A-2	1630.49	1602.13	28.36	-98.22	0.00	10.00	10.00	0.00
M11	1767.23	1865.45	-98.22	-102.41	0.00	11.00	11.00	0.00
H-3	1827.47	1760.87	66.60	-130.76	0.00	12.00	12.00	0.00
M10	1609.17	1689.75	-80.58	-149.69	0.00	13.00	13.00	0.00
G-2	1200.05	1302.46	-102.41	-168.61	0.00	14.00	14.00	0.00

MEAN A: 1732.15 STD DEV A: 219.39 SUM OF N MINUS: 93.00 -------
MEAN B: 1792.84 STD DEV B: 217.11 SUM OF N PLUS : ------- 12.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL FOOT X

FUNCTION A = G: 10 CELL: G MIN
FUNCTION B = G: 10 CELL: J MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
F-3	-558.37	-344.47	-213.90	0.00	0.15	1.00	0.00	1.00
H-4	-590.72	-368.57	-222.15	0.00	13.91	2.00	0.00	2.00
M13	-367.29	-432.35	65.06	0.00	18.36	3.00	0.00	3.00
A-3	-305.55	-323.91	18.36	-23.08	0.00	4.00	4.00	0.00
G-3	-305.25	-282.17	-23.08	-42.18	0.00	5.00	5.00	0.00
M-2	-375.88	-333.70	-42.18	0.00	65.06	6.00	0.00	6.00
S-3	-355.24	-202.36	-152.88	-71.76	0.00	7.00	7.00	0.00
K-1	-249.91	-263.82	13.91	0.00	83.62	8.00	0.00	8.00
F-2	-349.93	-350.08	0.15	-89.66	0.00	9.00	9.00	0.00
A-2	-417.13	-296.78	-120.35	-94.17	0.00	10.00	10.00	0.00
M11	-346.81	-275.05	-71.76	-120.35	0.00	11.00	11.00	0.00
H-3	-434.90	-518.52	83.62	-152.88	0.00	12.00	12.00	0.00
M10	-376.39	-286.73	-89.66	-213.90	0.00	13.00	13.00	0.00
G-2	-355.25	-261.08	-94.17	-222.15	0.00	14.00	14.00	0.00

MEAN A: -384.90 STD DEV A: 92.72 SUM OF N MINUS: 85.00 -------
MEAN B: -324.26 STD DEV B: 79.13 SUM OF N PLUS : ------- 20.00

*** SIGNIFICANT DIFFERENCE ***

APPENDIX D

SUMMARY OF PHOTOMETRIC DATA

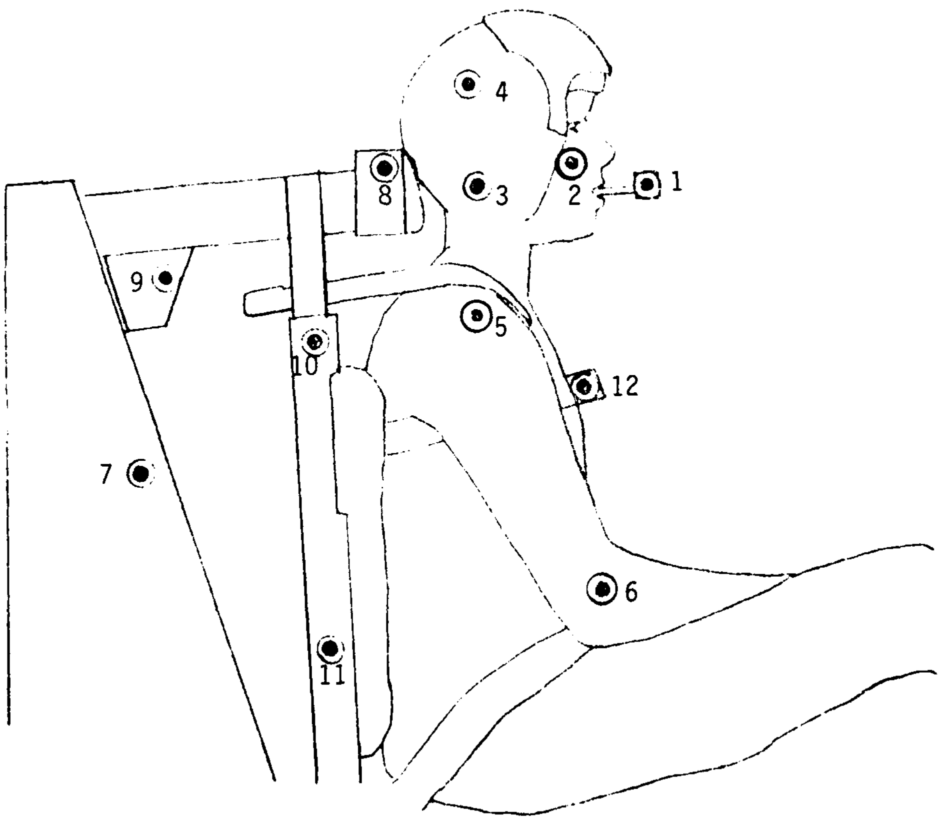
The photometric data obtained from this test program were analyzed to characterize the motions of photometric targets (fiducials) fixed to the test subject and thus describe the subject's dynamic response to impact. Reduction of the film data included digitization of target position information and computer plotting of the position-time, velocity-time, and acceleration-time history of each fiducial.

Fiducials were placed on subjects and the test fixture in accordance with the guidelines provided in "Film Analysis Guide for Dynamic Studies of Test Subjects" (SAE J138, March 1980). The positions of subject-mounted fiducials relative to reference fixture-mounted fiducials were documented for each subject prior to each test. The locations and number designations of each fiducial are shown in Figure D - 1. The distance between the "mouth pack" target (Target No. 1) and the center of the triaxial accelerometer in the mouth was four inches.

The photometric data were obtained by three 16 mm Milliken cameras, two mounted on the test carriage and one mounted off the carriage. The off-board camera and one on-board camera were positioned to provide a frontal view of the subject and the other on-board camera was positioned to provide a right lateral view of the subject. Each camera lens had a focal length of 10 mm. During the impact, the cameras were operated at 500 frames/sec.

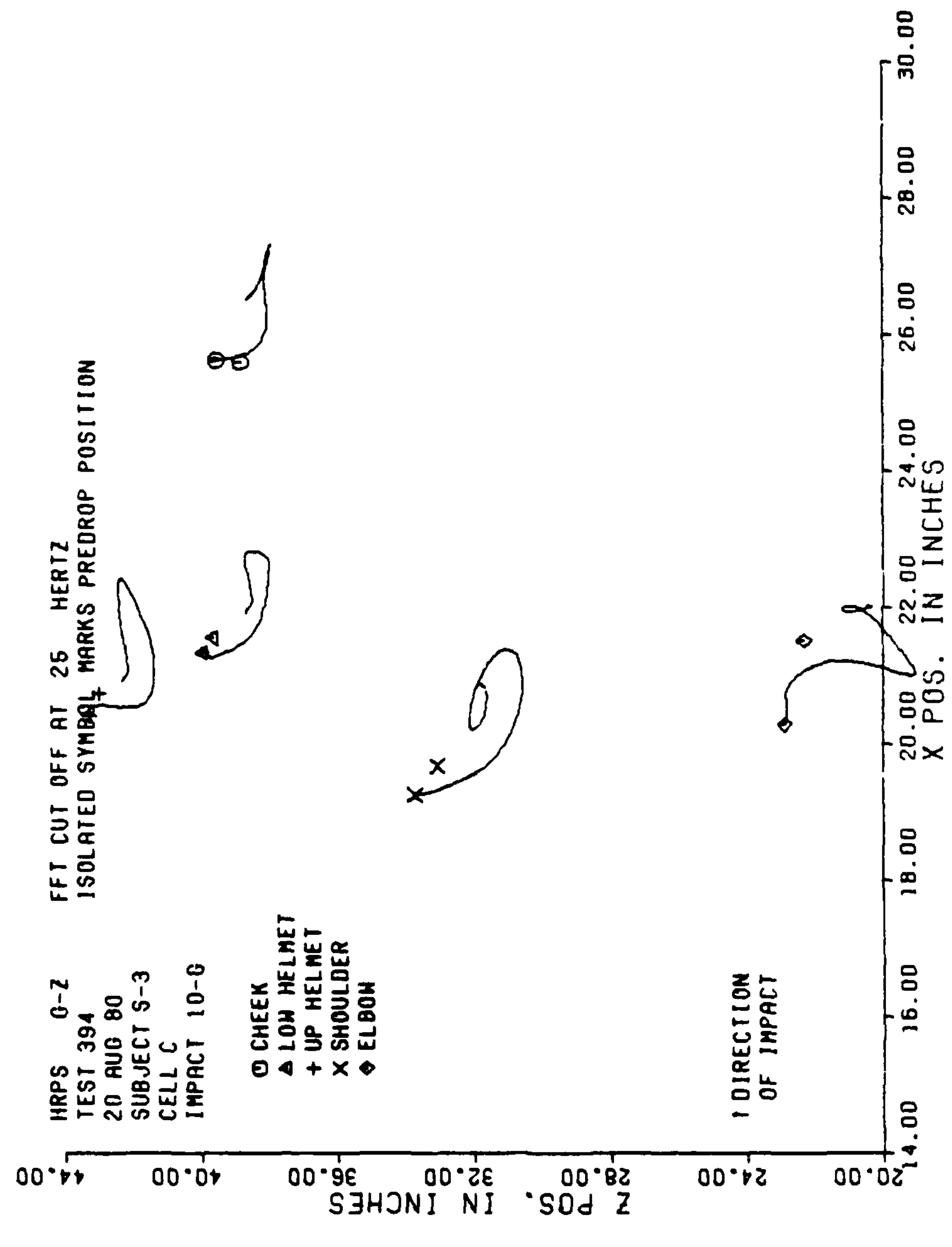
The Photo Digitizing Systems Model 200 processor consists of an Automatic Film Reader (AFR), an electronic scanning camera, and a Data General Corporation (DGC) Nova 3/12 computer. This system was utilized for target position digitization. The semi-automatic ARF is manually initialized by selecting, with a cursor, targets of interest in the first frame of data. Targets on subsequent frames are automatically scanned, acquired, and identified. The target coordinates are then digitized by the Nova computer and the digitized data are then stored on magnetic tape. The coordinate resolution of the ARF is 0.025% of the major film dimension.

These digitized data were then processed on the Control Data Corporation (CDC) Cyber 74 computer system. The computer analysis routine used to process the film data has been described elsewhere (Graf _et al._, 1978; Brinkley _et al._, 1981). The program permitted the graphic presentation of position-time, velocity-time, and acceleration-time histories of fiducials and abscissa-ordinate position histories as well. Typical data from each cell of the experimental matrix are presented. The tests selected are the same as those selected for presentation in Apendix B.



1. Mouthpack
2. Cheek
3. Lower Helmet
4. Upper Helmet
5. Shoulder
6. Elbow
7. Upper Frame
8. Front Head Rest
9. Rear Head Rest
10. Upper Seat Back
11. Lower Seat Back
12. Chest Pack

Figure D - 1. Locations of Fiducials.


HRPS G-Z
TEST 394
20 AUG 80
SUBJECT S-3
CELL C
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
ISOLATED SYMBOL MARKS PREDROP POSITION
⊖ CHEEK
▲ LOW HELMET
+ UP HELMET
X SHOULDER
◆ ELBOW
↑ DIRECTION
OF IMPACT
Z POS. IN INCHES
44.00
40.00
36.00
32.00
28.00
24.00
20.00
X POS. IN INCHES
14.00
16.00
18.00
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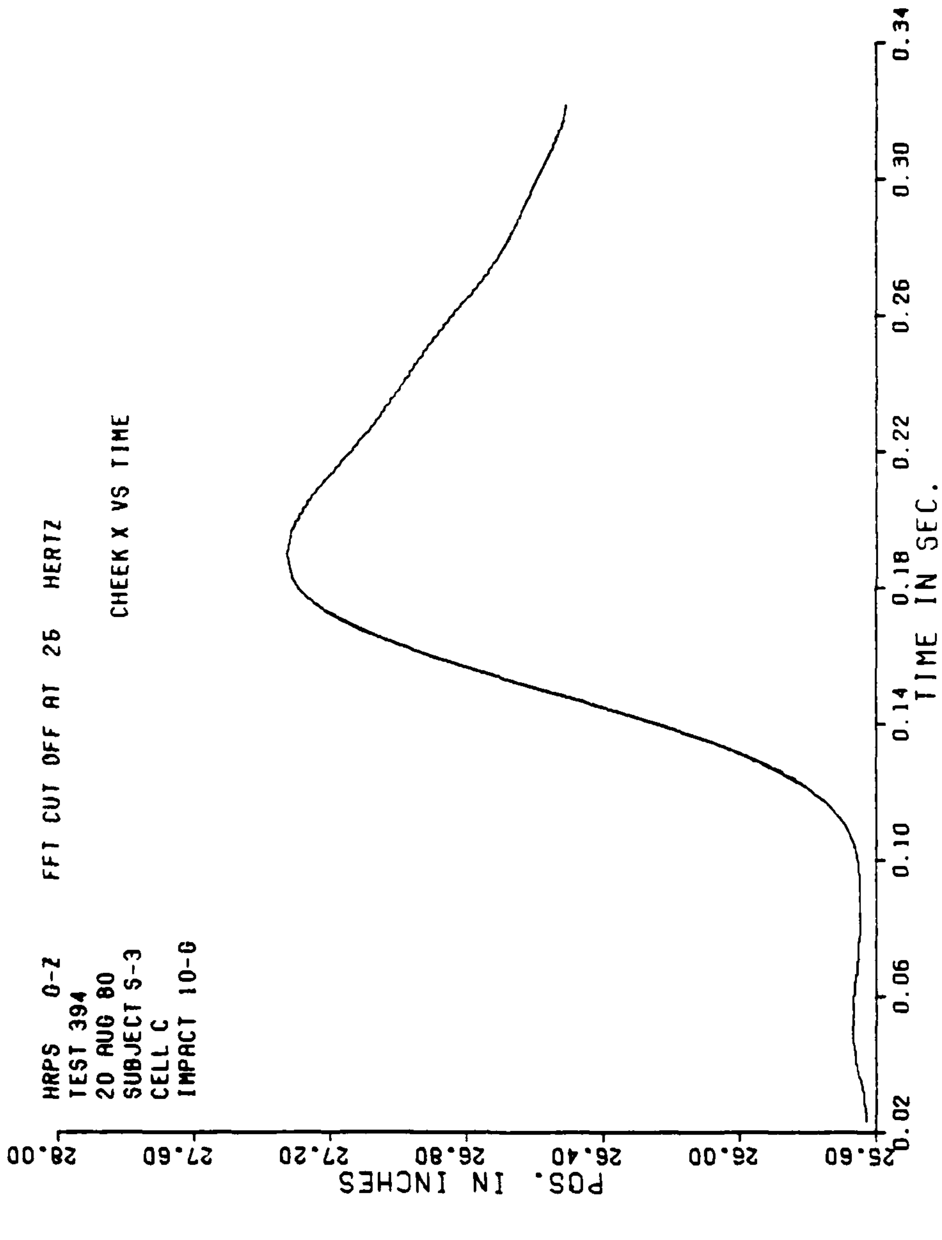
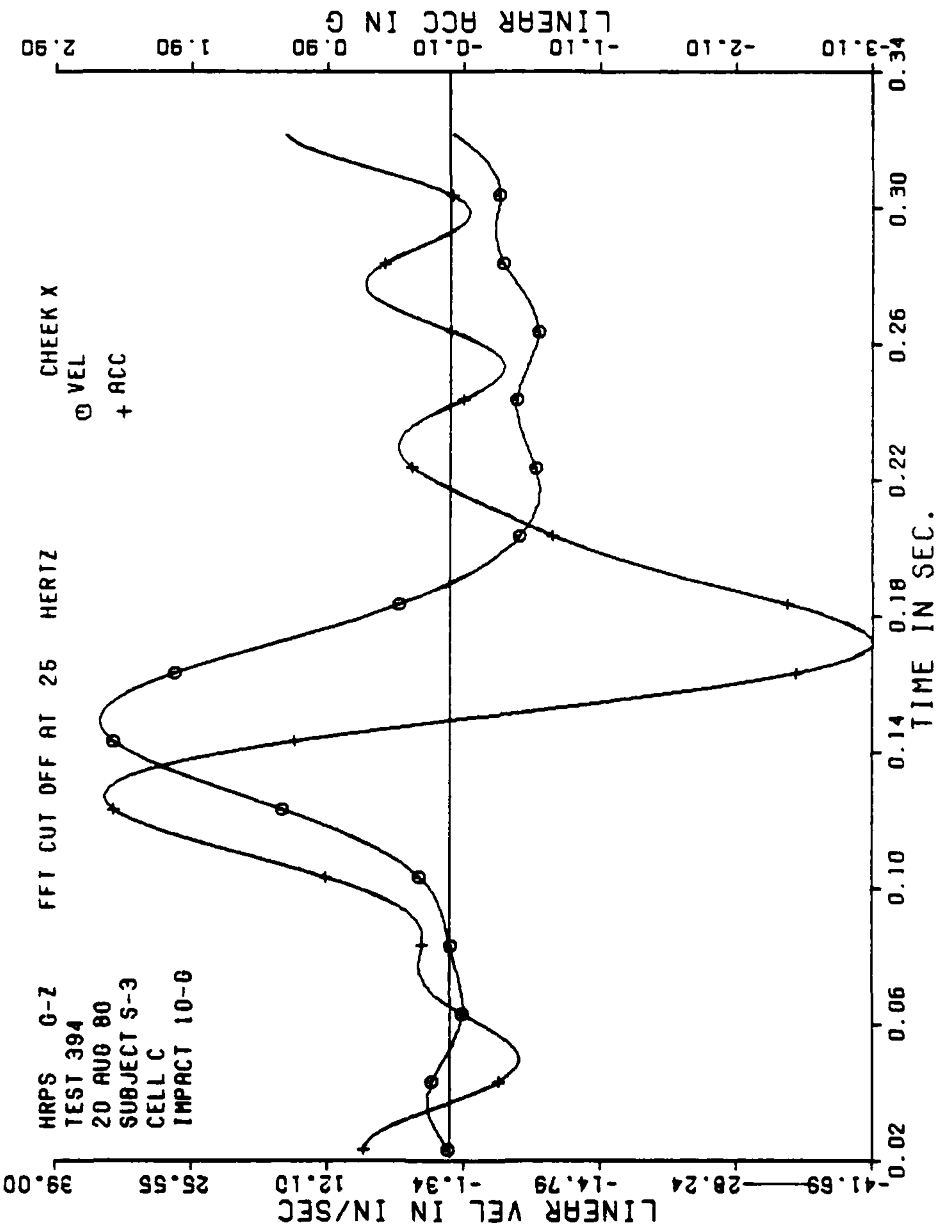
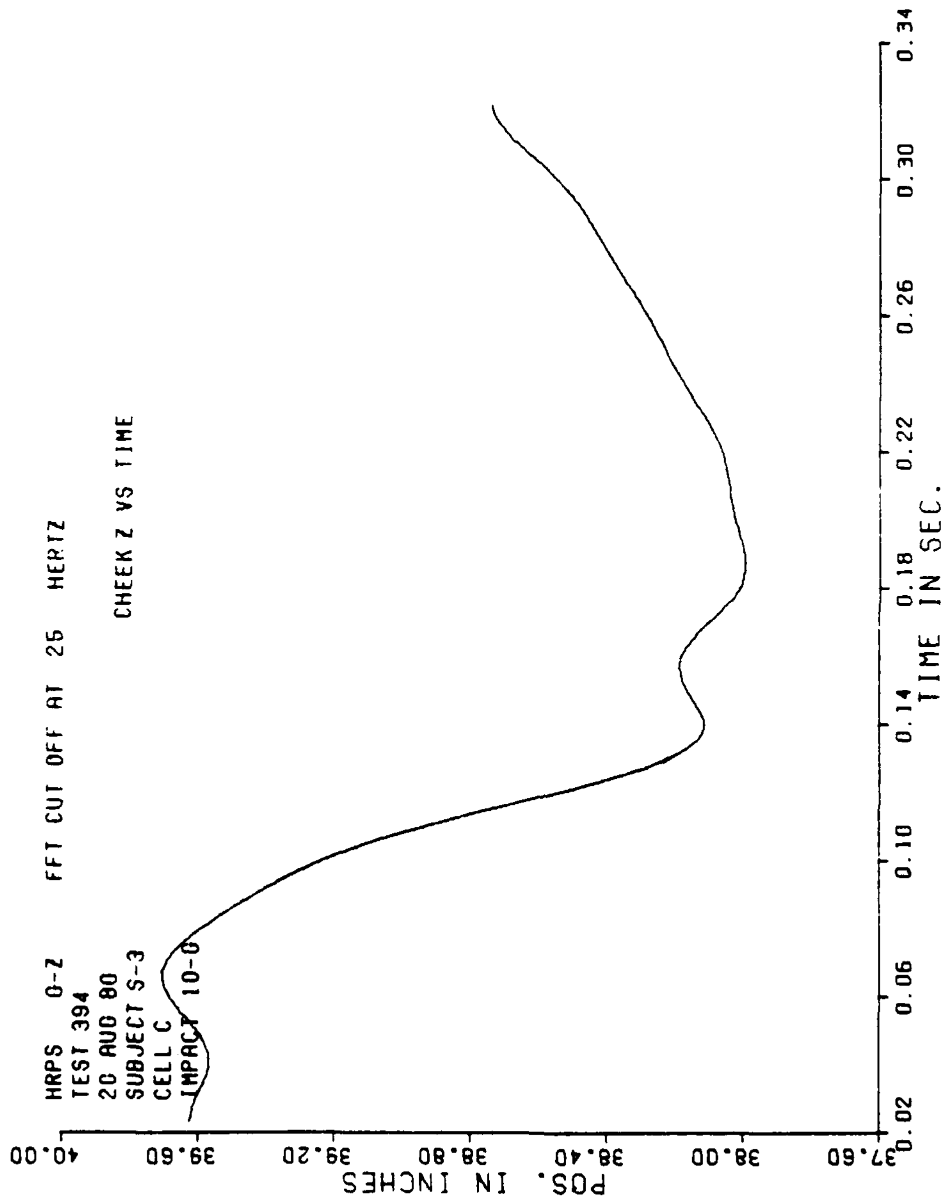
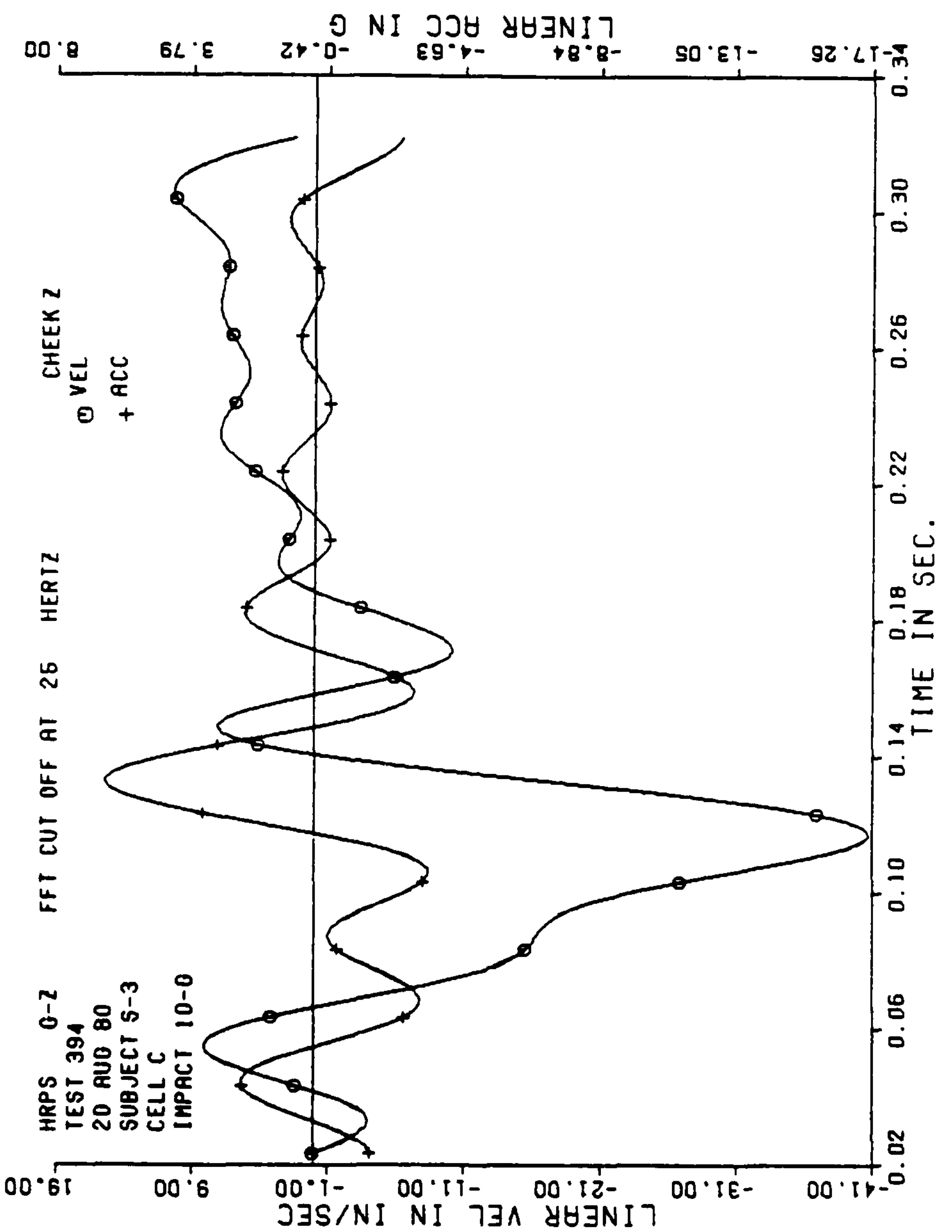
22.00
24.00
26.00
28.00
30.00

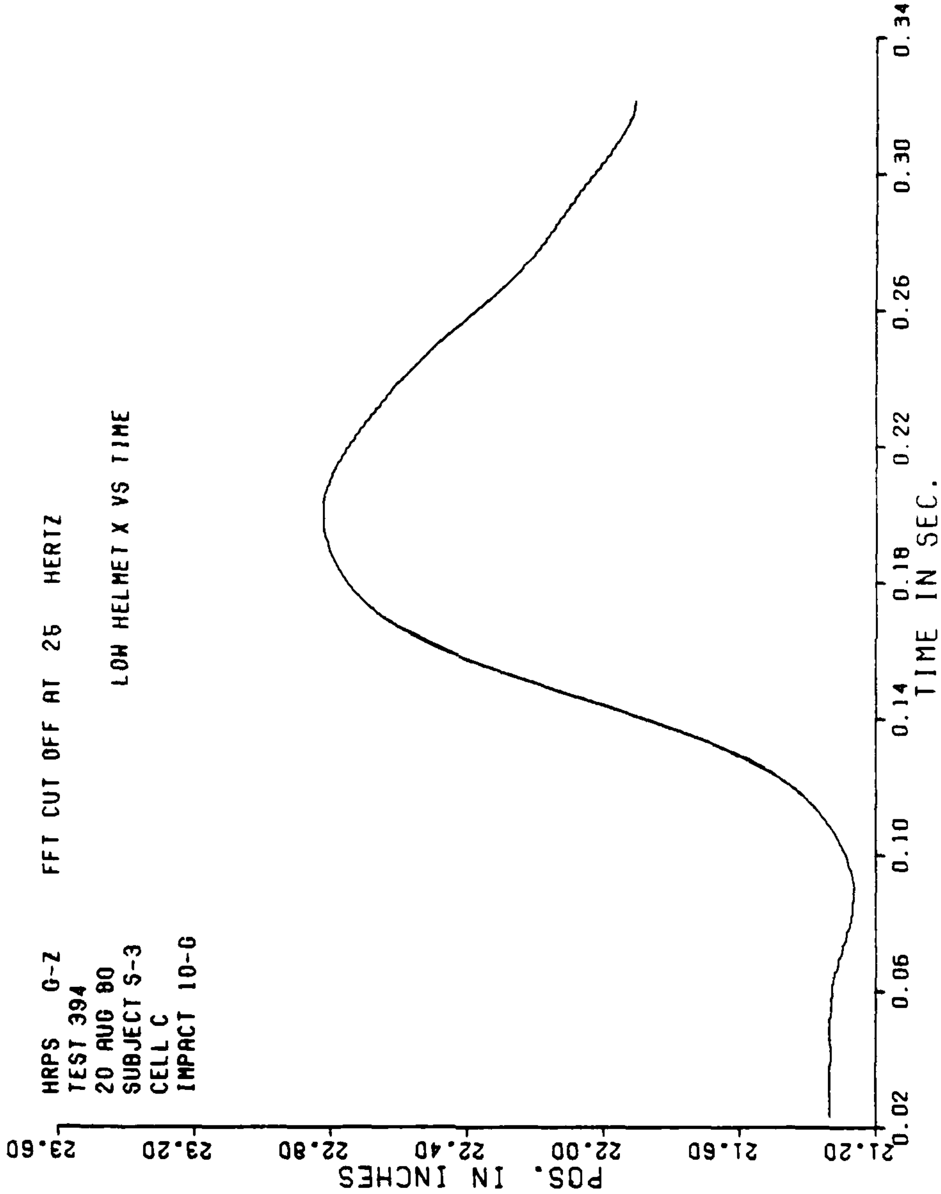

HRPS G-Z
TEST 394
20 AUG 80
SUBJECT S-3
CELL C
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
CHEEK X VS TIME
POS. IN INCHES
TIME IN SEC.
25.60
26.00
26.40
26.80
27.20
27.60
28.00
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34

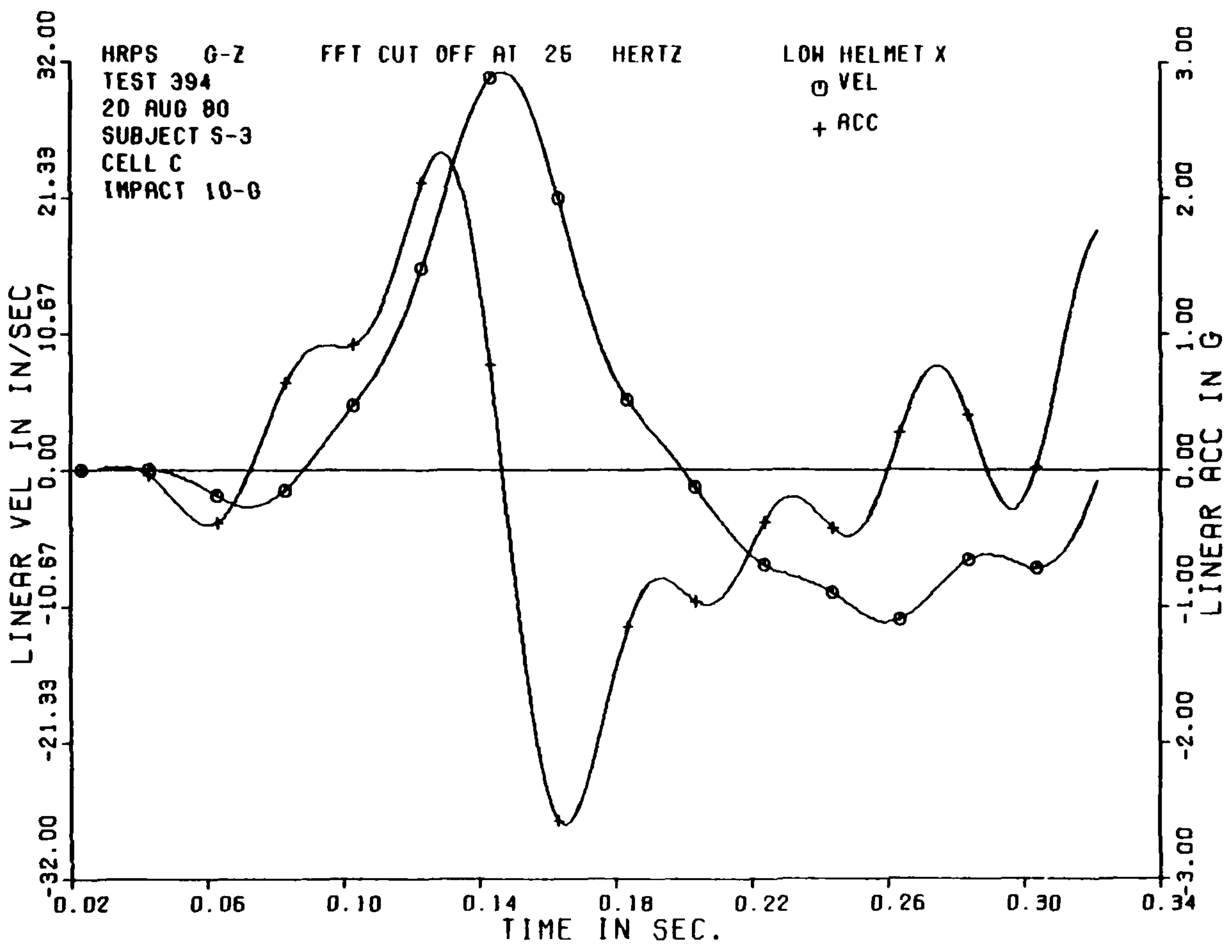

HRPS G-Z
TEST 394
20 AUG 80
SUBJECT S-3
CELL C
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
CHEEK X
VEL
+ ACC
LINEAR ACC IN G
2.90
1.90
0.90
-0.10
-1.10
-2.10
-3.10
LINEAR VEL IN IN/SEC
39.00
25.55
12.10
-1.34
-14.79
-28.24
-41.69
TIME IN SEC.
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34

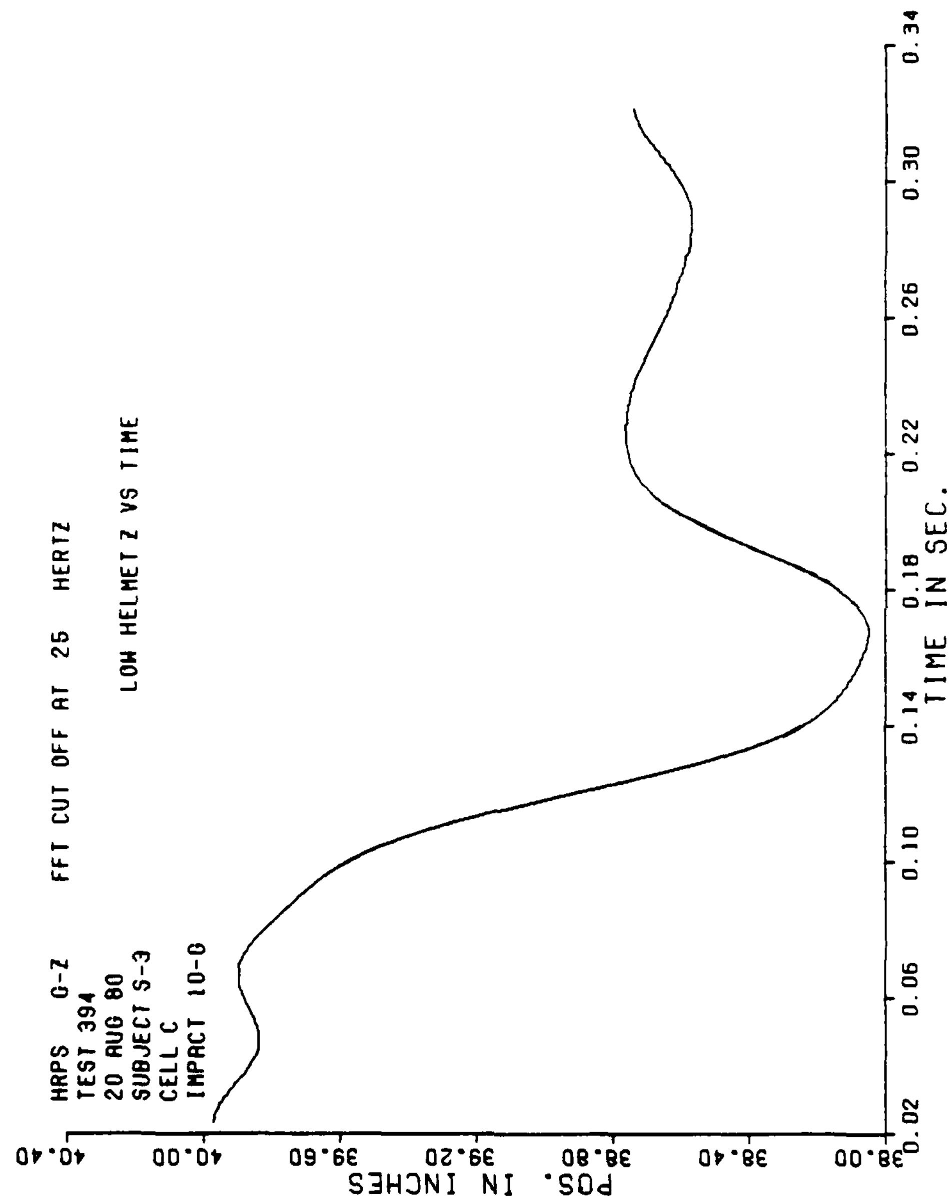


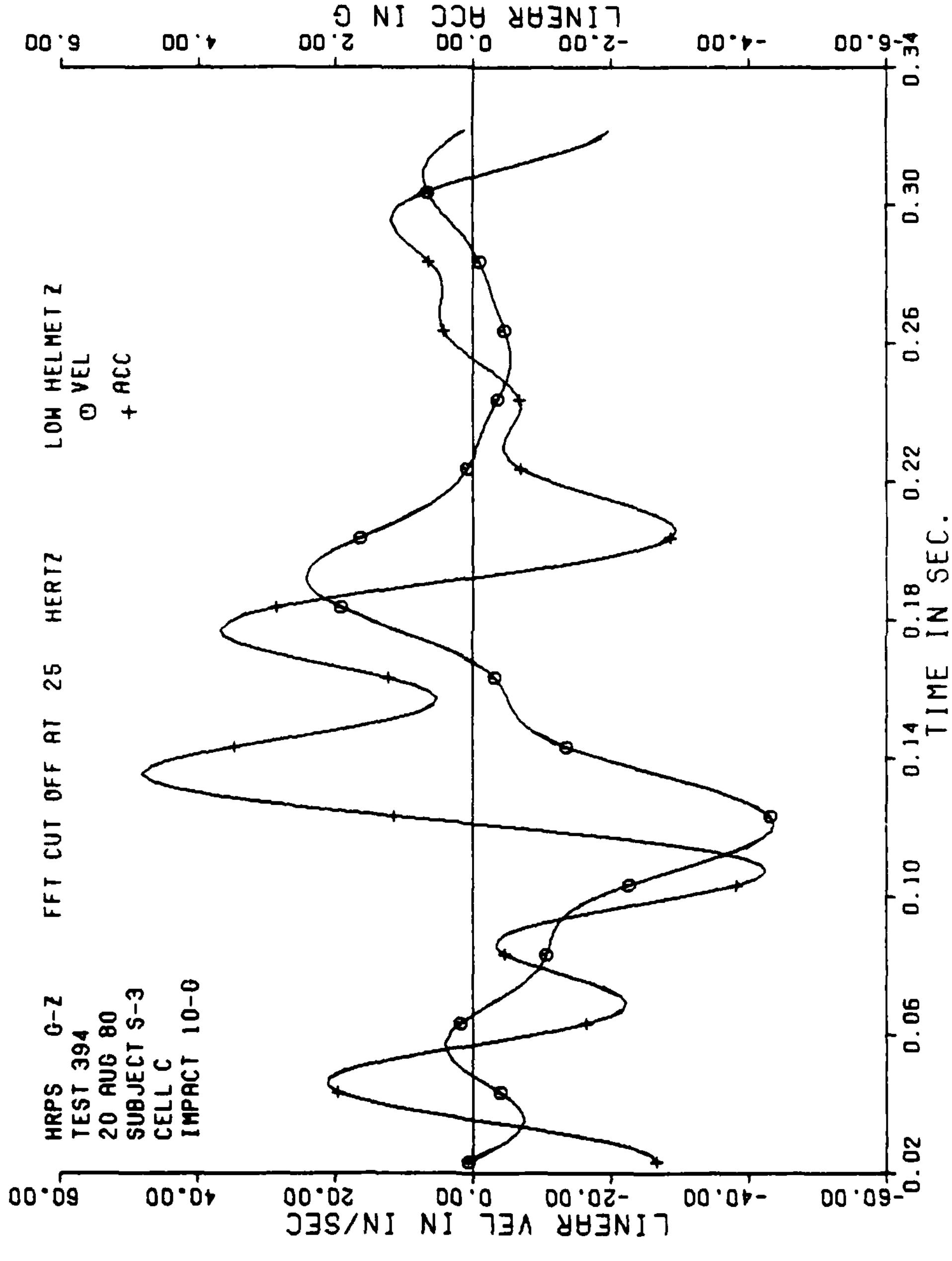
HRPS O-Z
TEST 394
20 AUG 80
SUBJECT S-3
CELL C
IMPACT 10-0
FFT CUT OFF AT 25 HERTZ
CHEEK Z VS TIME
POS. IN INCHES
40.00
39.60
39.20
38.80
38.40
38.00
37.60
TIME IN SEC.
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34

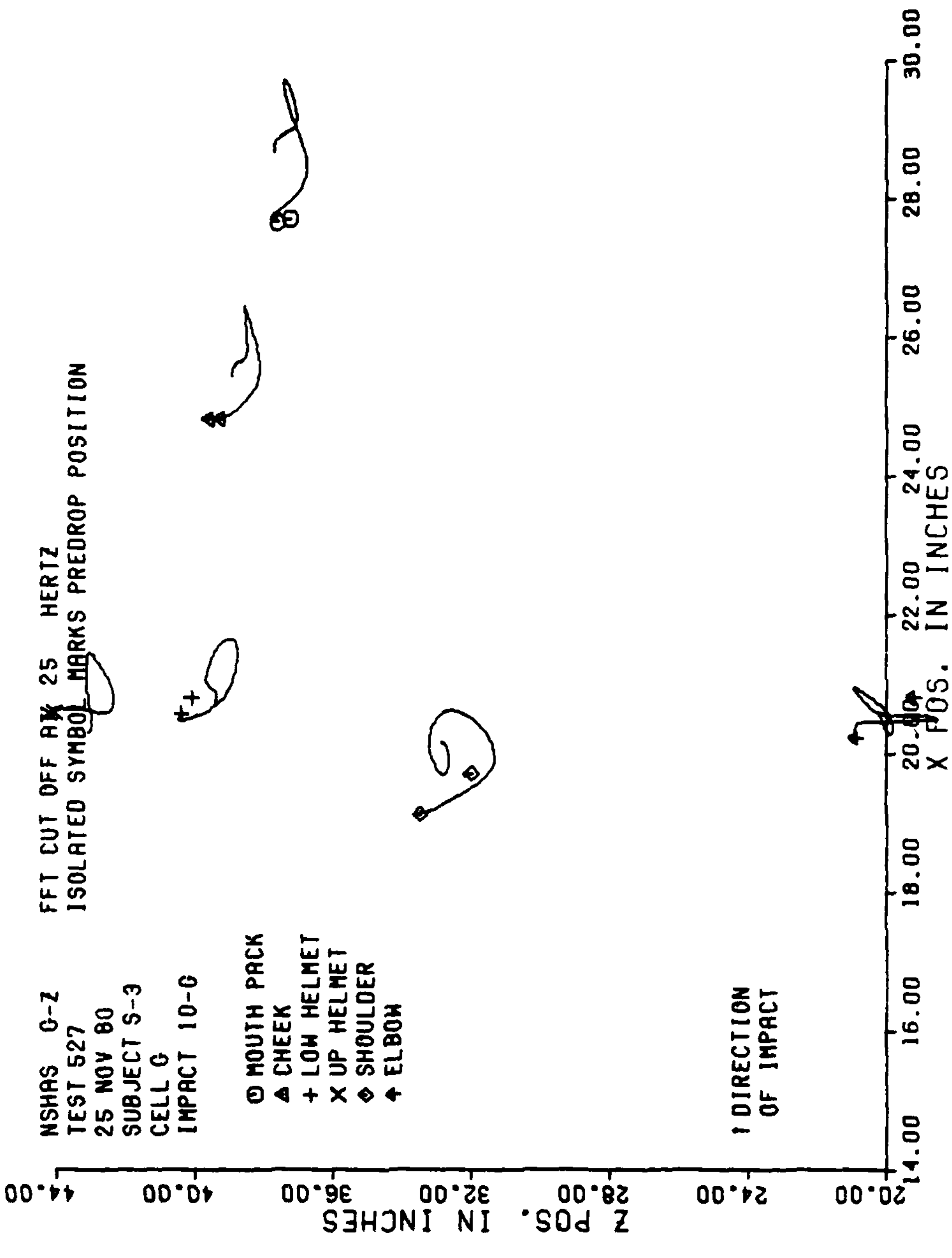

HRPS G-Z
TEST 394
20 AUG 80
SUBJECT S-3
CELL C
IMPACT 10-0
FFT CUT OFF AT 25 HERTZ
CHEEK Z
VEL
+ ACC
LINEAR ACC IN G
8.00
3.79
-0.42
-4.63
-8.84
-13.05
-17.26
LINEAR VEL IN IN/SEC
19.00
9.00
-1.00
-11.00
-21.00
-31.00
-41.00
TIME IN SEC.
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34

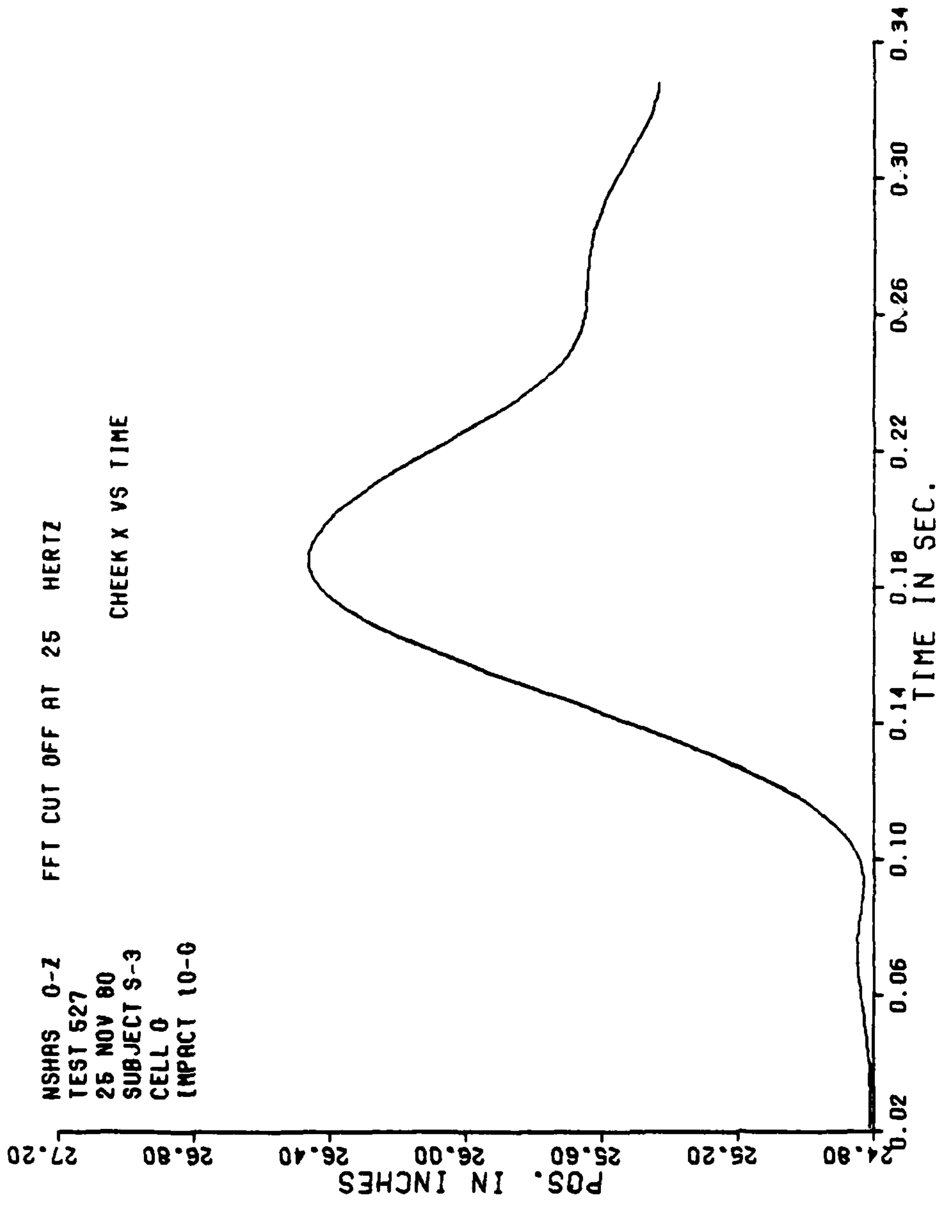

HRPS G-Z
TEST 394
20 AUG 80
SUBJECT S-3
CELL C
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
LOW HELMET X VS TIME
POS. IN INCHES
23.60
23.20
22.80
22.40
22.00
21.60
21.20
TIME IN SEC.
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34

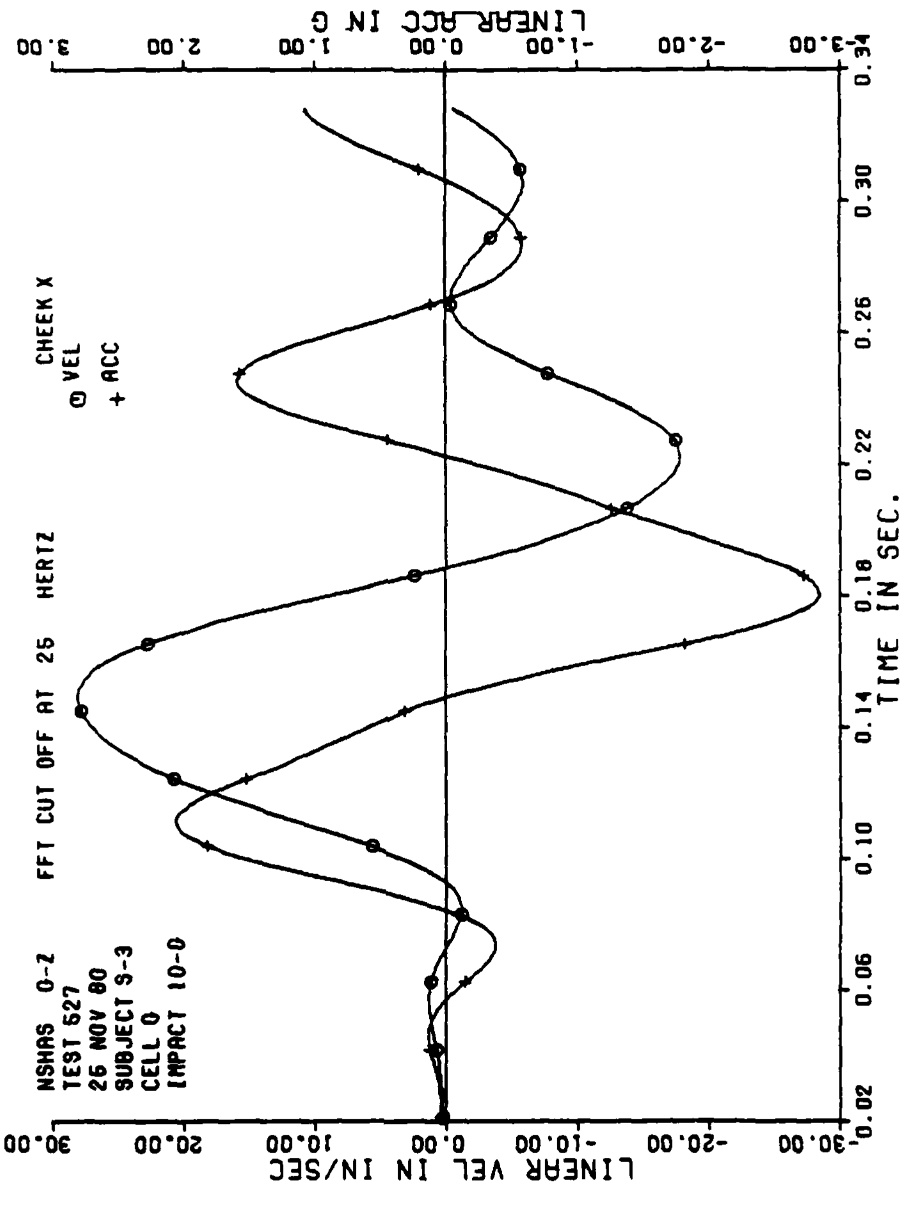

HRPS G-Z
TEST 394
20 AUG 80
SUBJECT S-3
CELL C
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
LOW HELMET X
VEL
+ ACC
LINEAR VEL IN IN/SEC
32.00
21.33
10.67
0.00
-10.67
-21.33
-32.00
LINEAR ACC IN G
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.


HRPS G-Z
TEST 394
20 AUG 80
SUBJECT S-3
CELL C
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
LOW HELMET Z VS TIME
POS. IN INCHES
40.40
40.00
39.60
39.20
38.80
38.40
38.00
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.

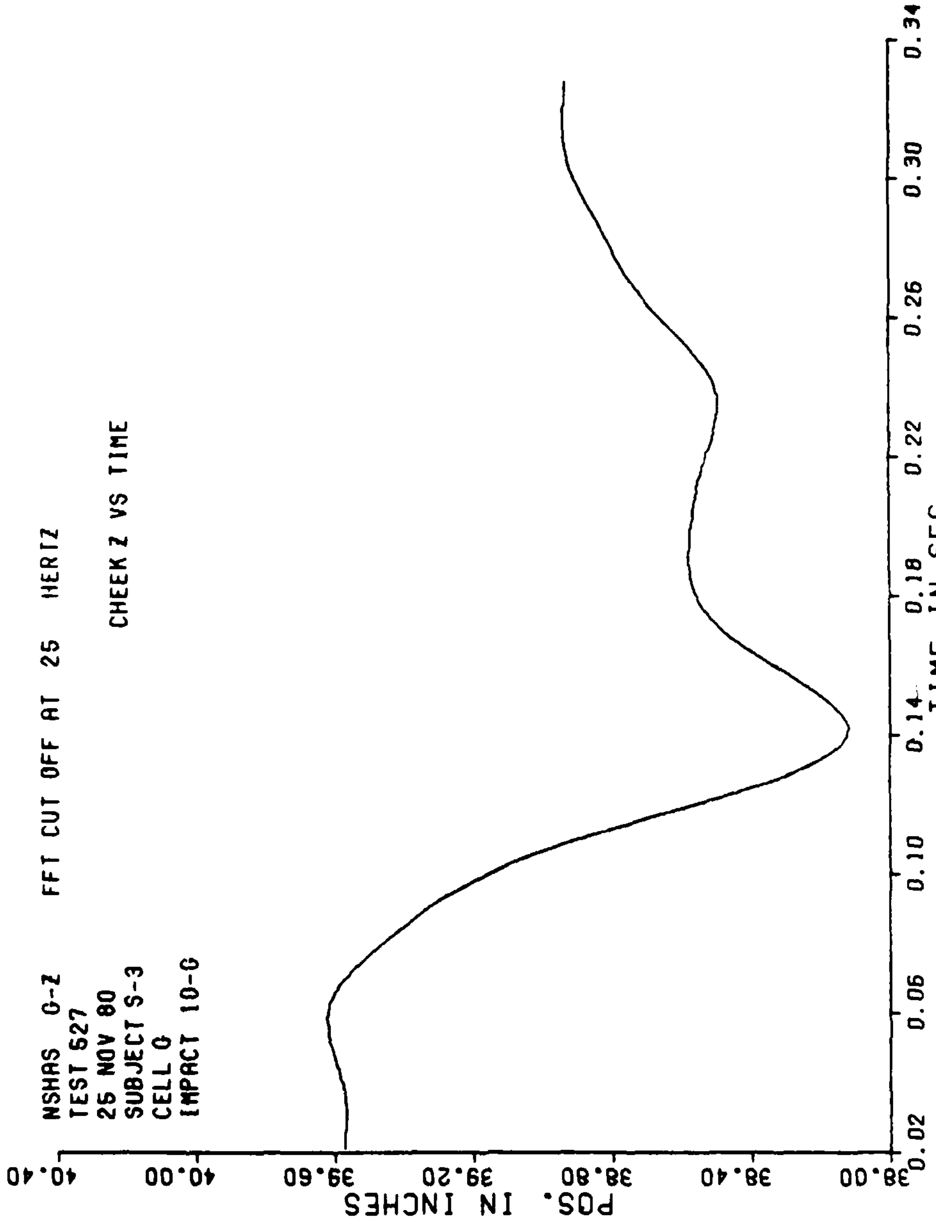

HRPS G-Z
TEST 394
20 AUG 80
SUBJECT S-3
CELL C
IMPACT 10-0
FFT CUT OFF AT 25 HERTZ
LOW HELMET Z
⊙ VEL
+ ACC
LINEAR ACC IN G
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
LINEAR VEL IN IN/SEC
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.

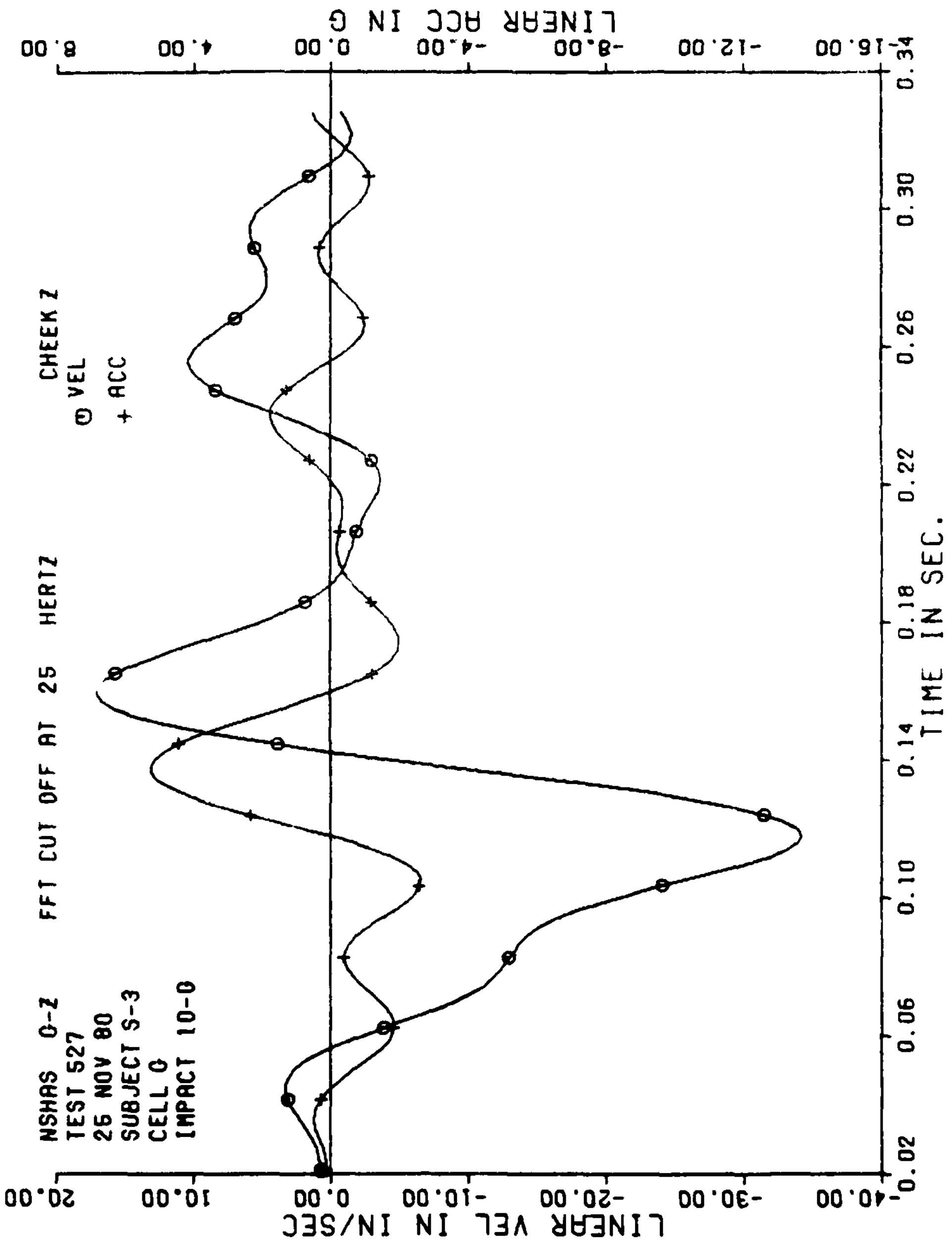

NSHAS 0-Z
TEST 527
25 NOV 80
SUBJECT S-3
CELL G
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
ISOLATED SYMBOL MARKS PREDROP POSITION
MOUTH PACK
CHEEK
LOW HELMET
UP HELMET
SHOULDER
ELBOW
DIRECTION OF IMPACT
Z POS. IN INCHES
44.00
40.00
36.00
32.00
28.00
24.00
20.00
X POS. IN INCHES
14.00
16.00
18.00
20.00
22.00
24.00
26.00
28.00
30.00

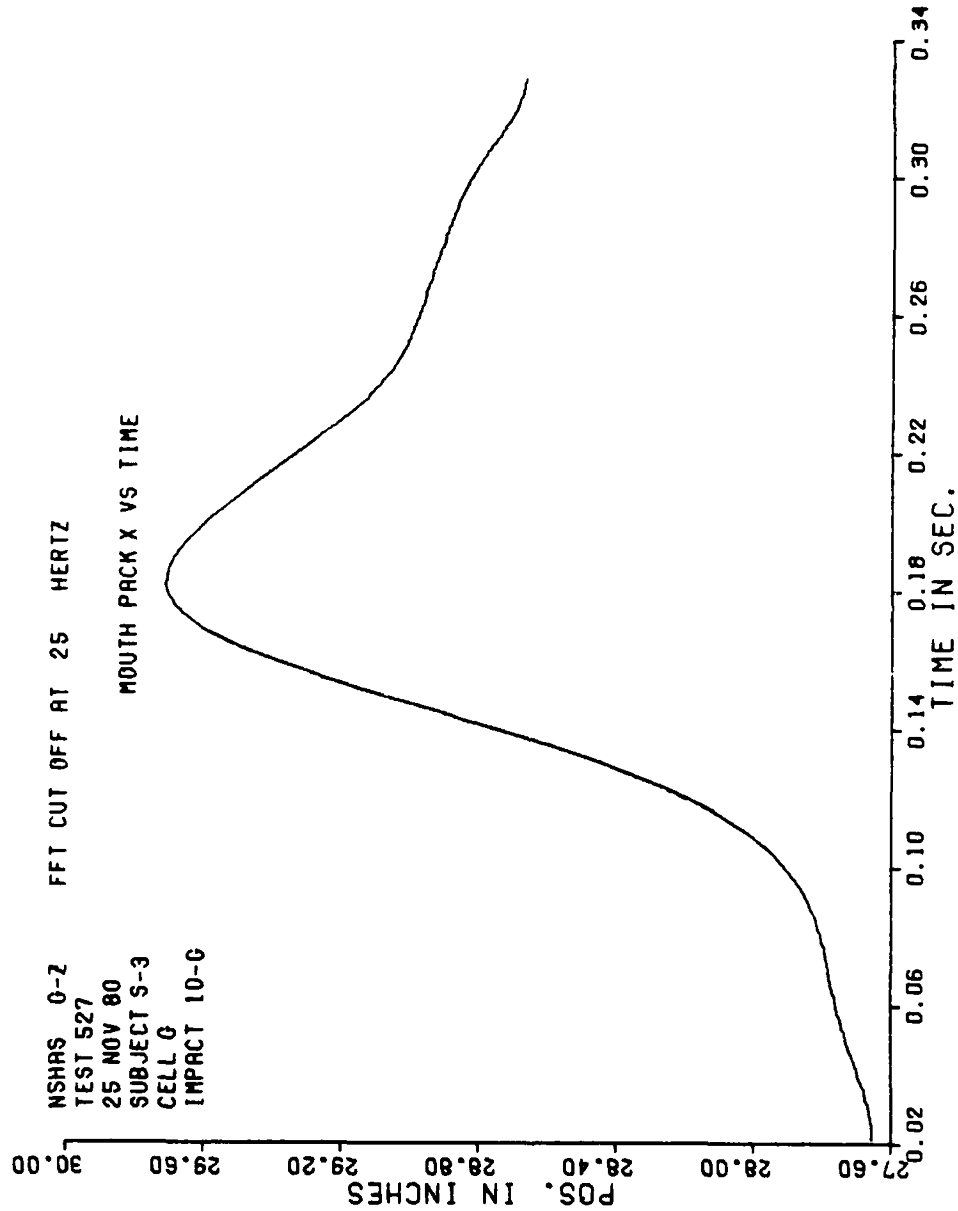

NSHAS 0-Z
TEST 527
25 NOV 80
SUBJECT S-3
CELL 0
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
CHEEK X VS TIME
POS. IN INCHES
24.80
25.20
25.60
26.00
26.40
26.80
27.20
TIME IN SEC.
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34

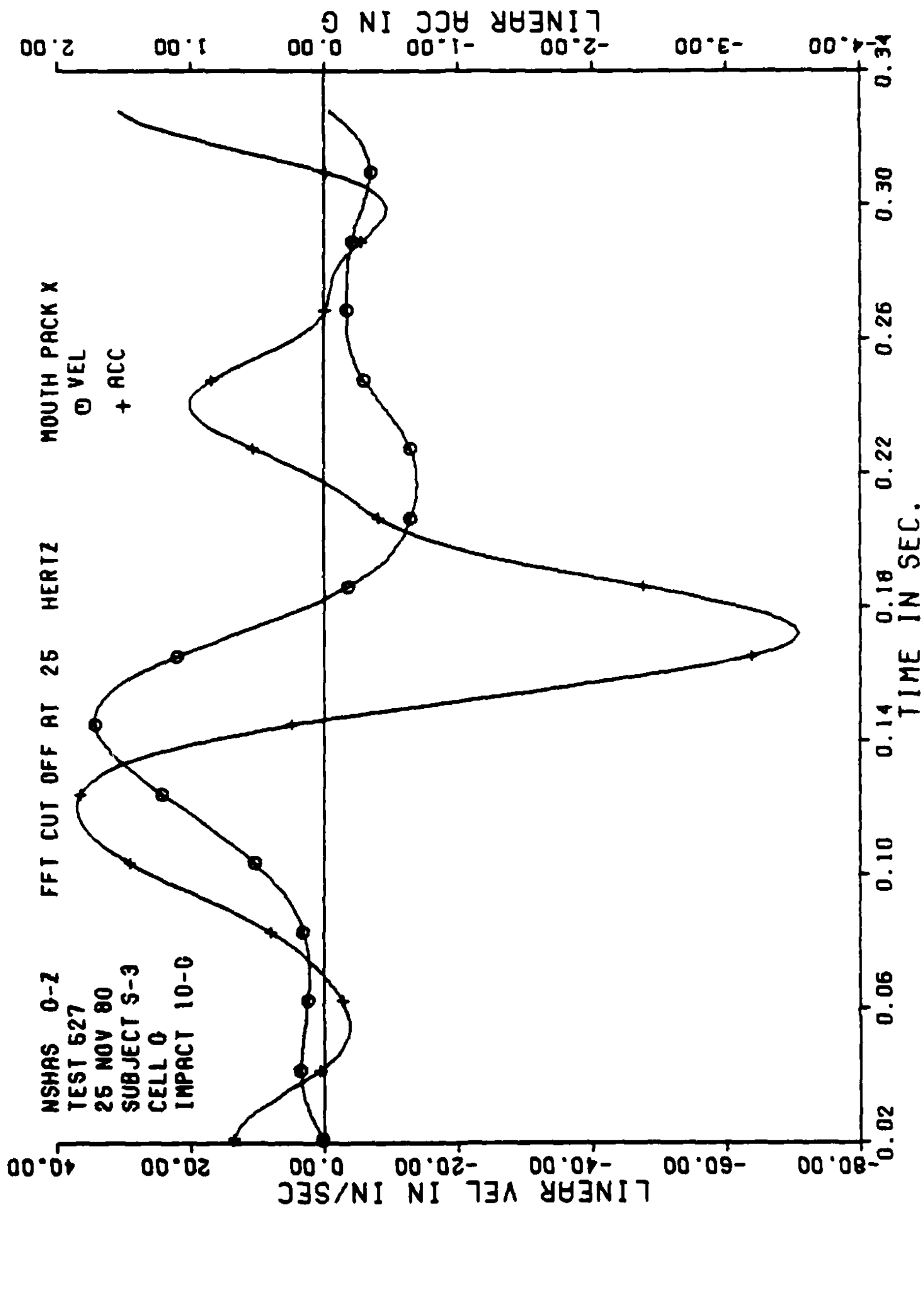


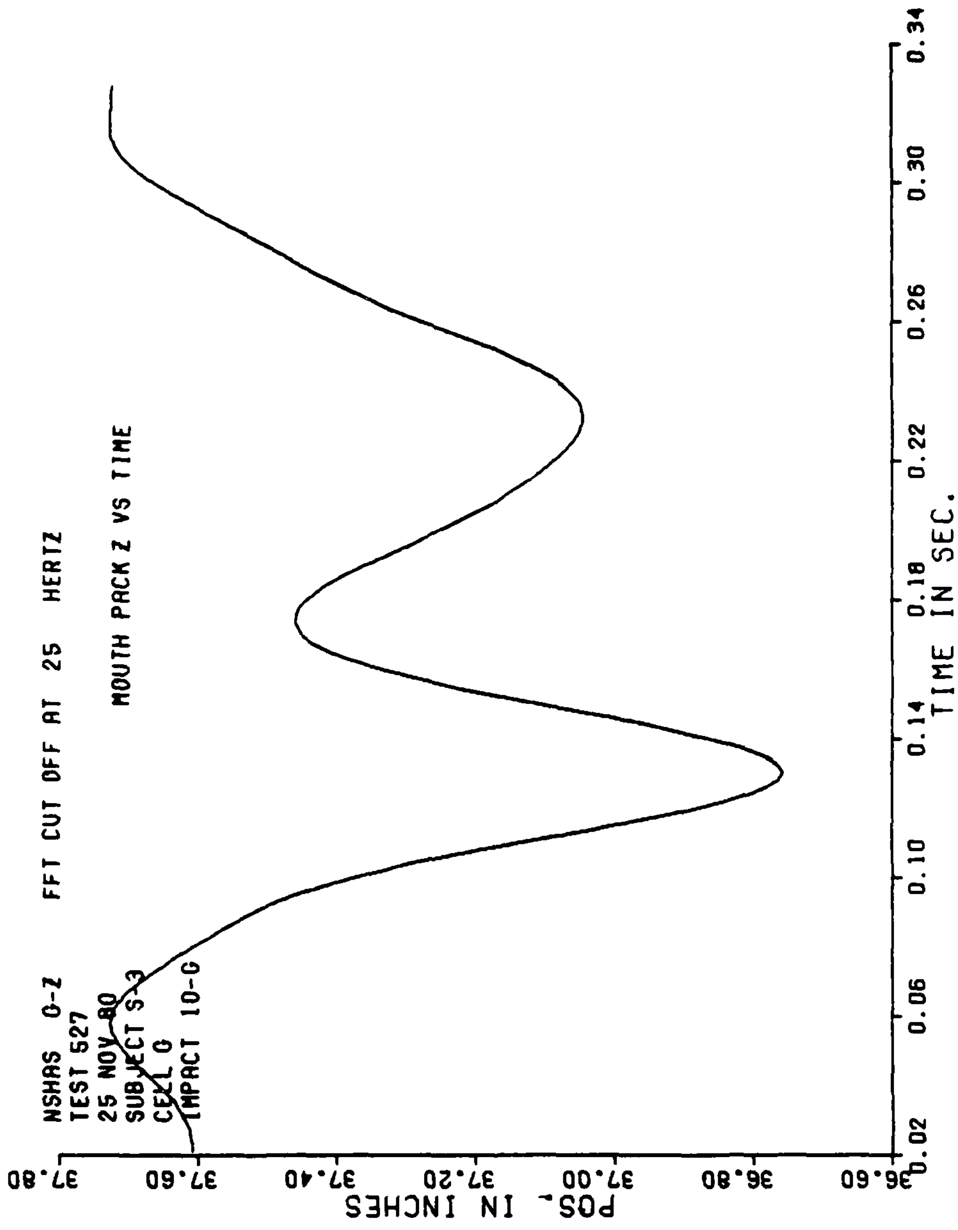
NSHAS 0-Z
TEST 527
26 NOV 80
SUBJECT S-3
CELL 0
IMPACT 10-0
FFT CUT OFF AT 25 HERTZ
CHEEK X
VEL
+ ACC
TIME IN SEC.
LINEAR VEL IN IN/SEC
LINEAR ACC IN G
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00

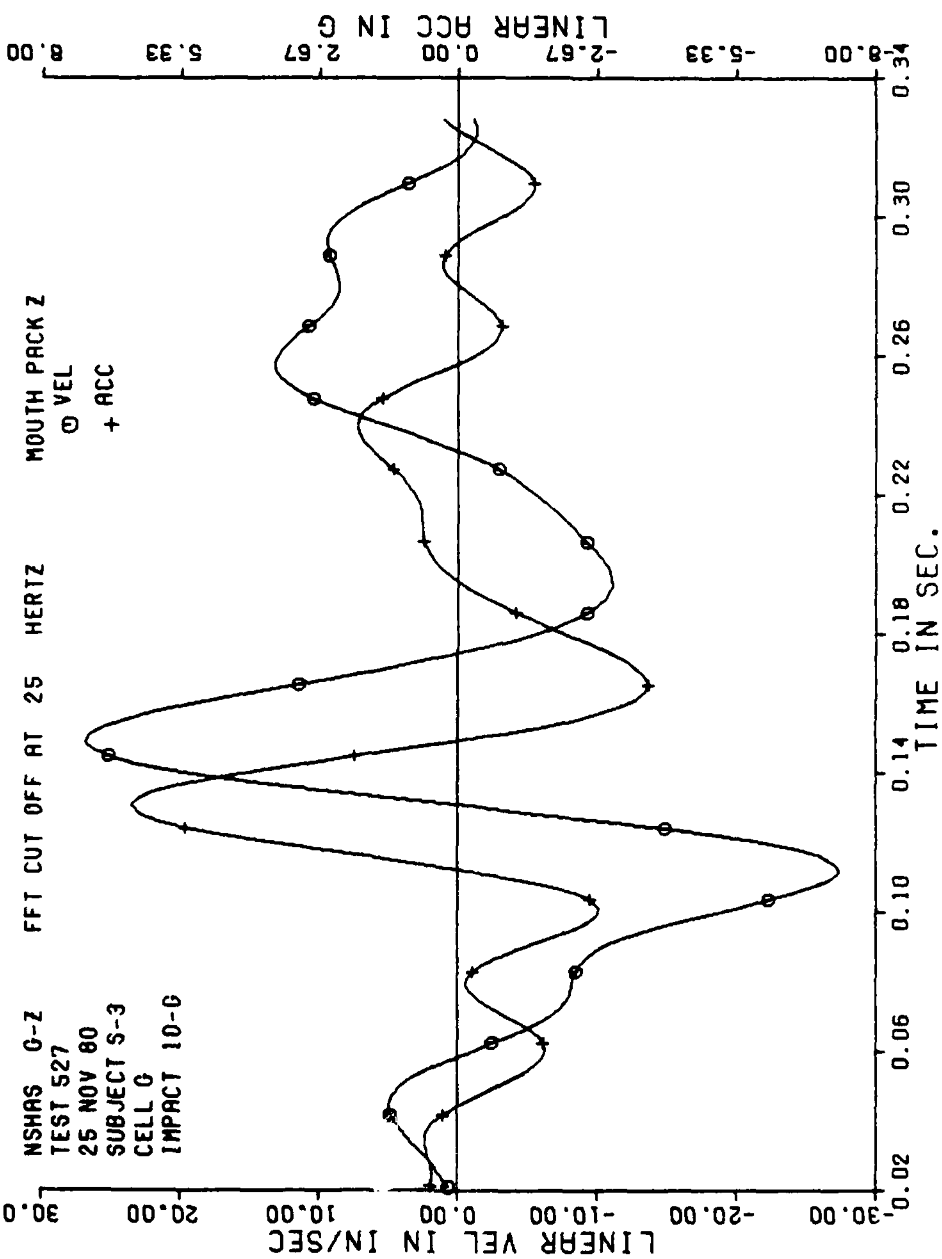

NSHAS G-Z
TEST 627
25 NOV 80
SUBJECT S-3
CELL G
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
CHEEK Z VS TIME
POS. IN INCHES
TIME IN SEC.
38.00
38.40
38.80
39.20
39.60
40.00
40.40
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34

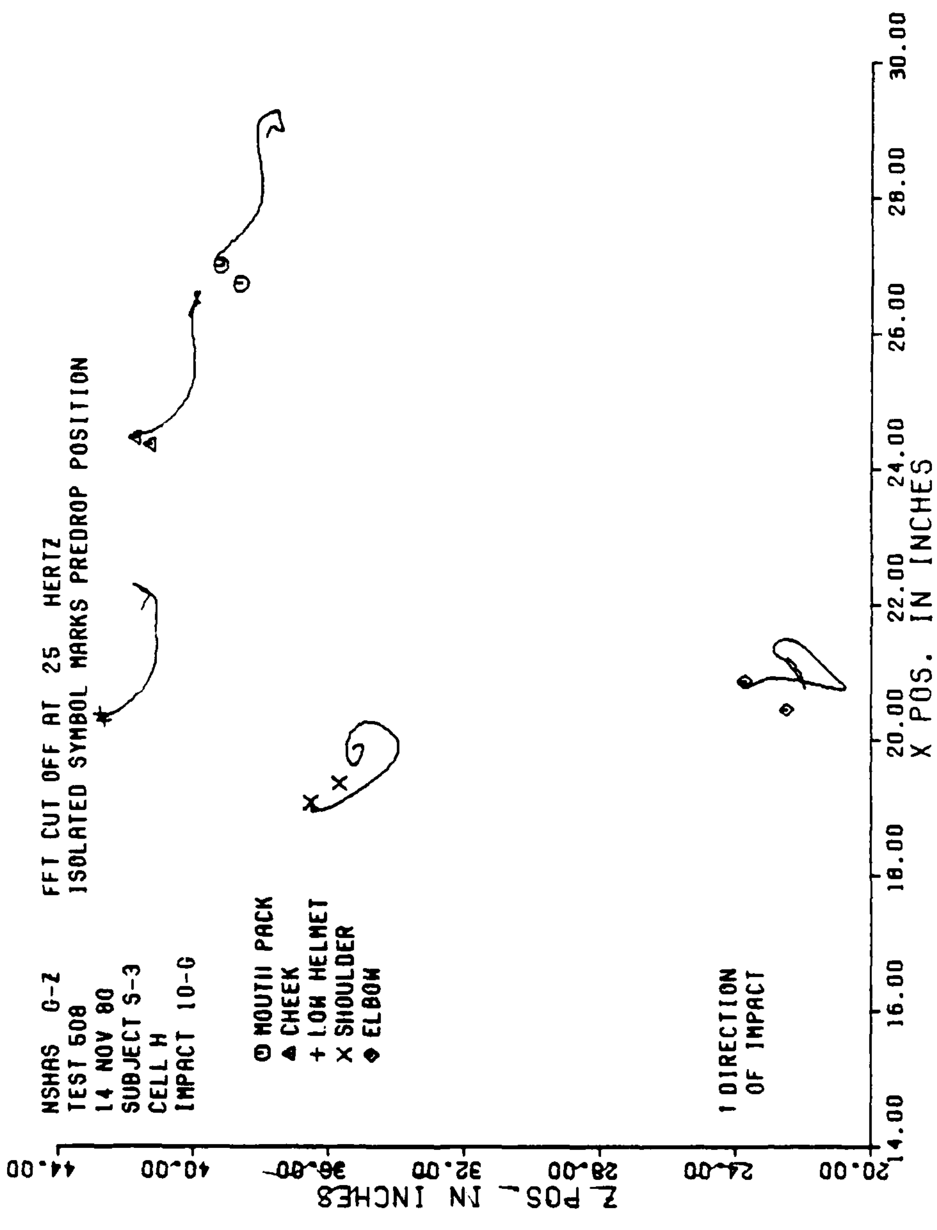

NSHAS O-Z
TEST 527
25 NOV 80
SUBJECT S-3
CELL G
IMPACT 10-0
FFT CUT OFF AT 25 HERTZ
CHEEK Z
⊖ VEL
+ ACC
LINEAR ACC IN G
8.00
4.00
0.00
-4.00
-8.00
-12.00
-16.00
LINEAR VEL IN IN/SEC
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
TIME IN SEC.
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34

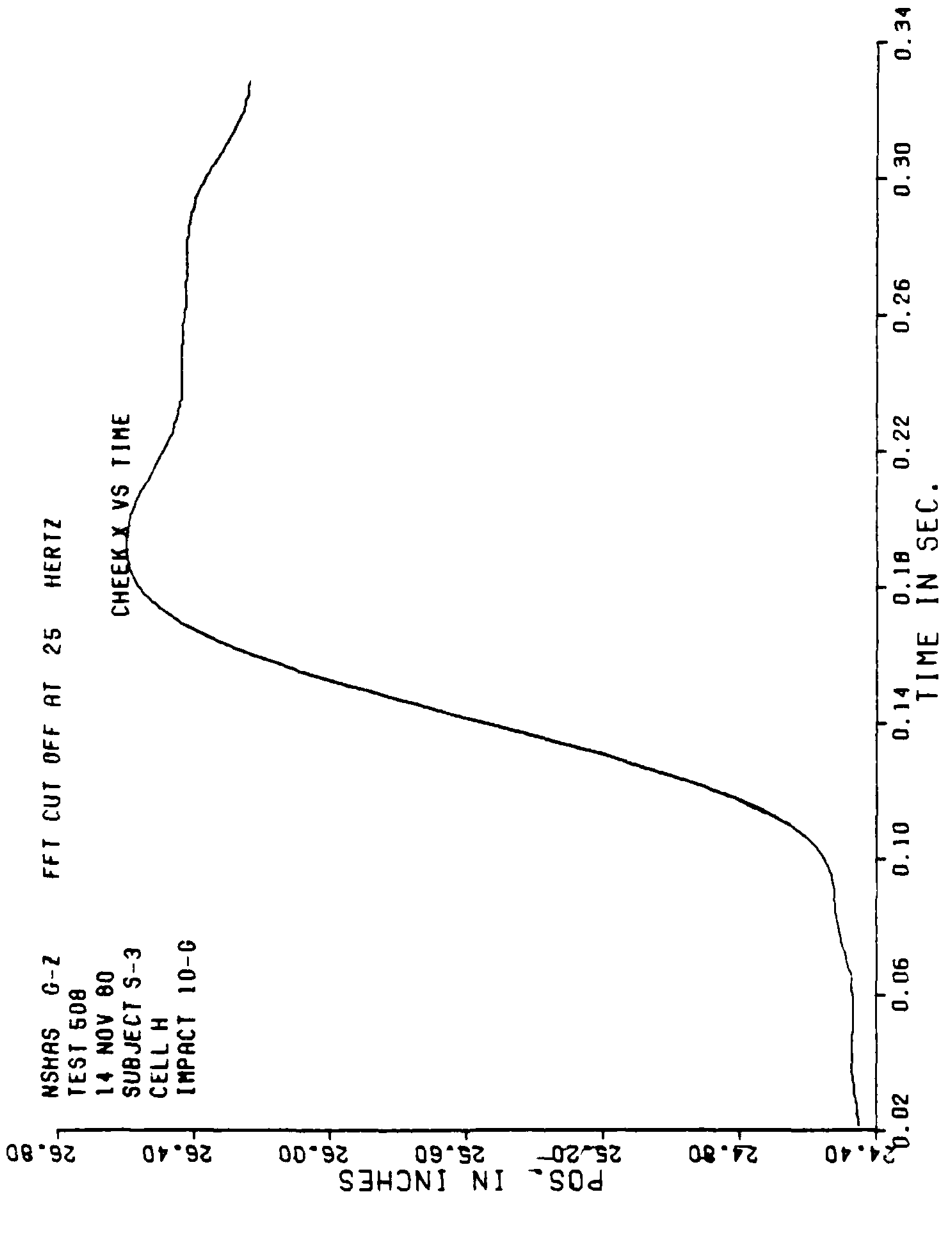

NSHAS 0-2
TEST 527
25 NOV 80
SUBJECT S-3
CELL G
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
MOUTH PACK X VS TIME
POS. IN INCHES
TIME IN SEC.
27.60
28.00
28.40
28.80
29.20
29.60
30.00
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34


NSHAS 0-Z
TEST 527
25 NOV 80
SUBJECT S-3
CELL 0
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
MOUTH PACK X
⊙ VEL
+ ACC
TIME IN SEC.
LINEAR VEL IN IN/SEC
LINEAR ACC IN G

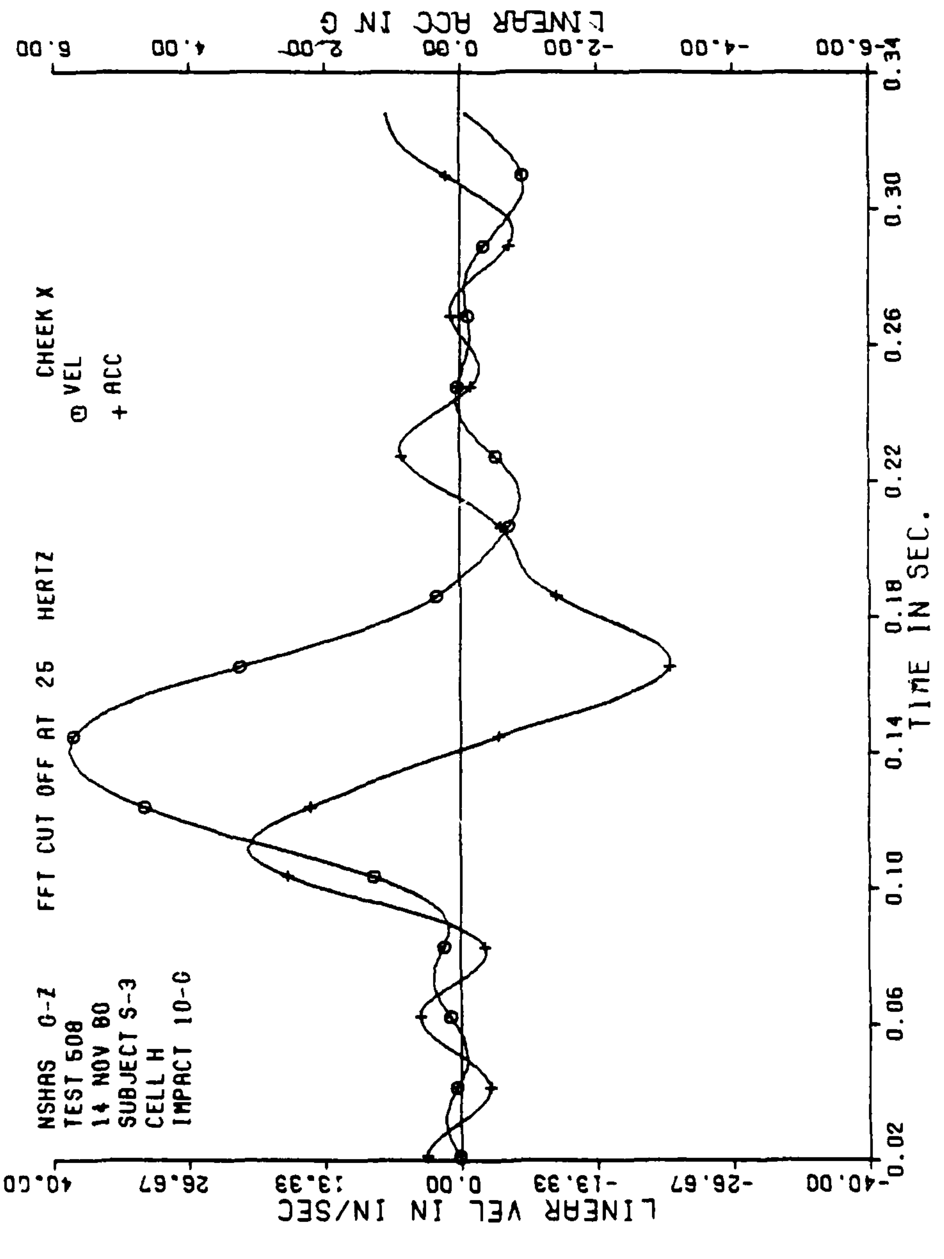

NSHAS O-Z
TEST 527
25 NOV 80
SUBJECT S-3
CELL O
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
MOUTH PACK Z VS TIME
POS. IN INCHES
37.80
37.60
37.40
37.20
37.00
36.80
36.60
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.

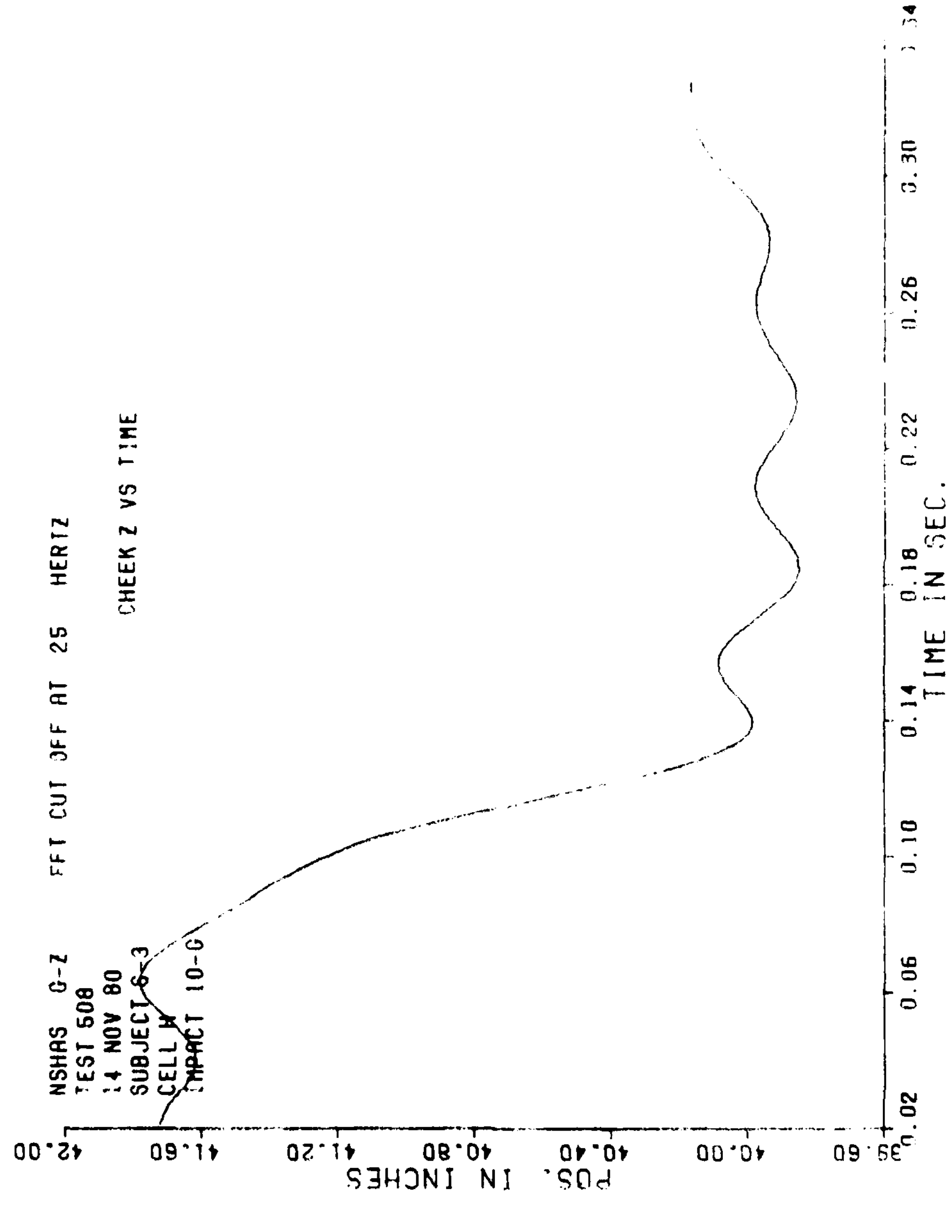

NSHAS G-Z
TEST 527
25 NOV 80
SUBJECT S-3
CELL G
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
MOUTH PACK Z
⊙ VEL
+ ACC
TIME IN SEC.
LINEAR VEL IN IN/SEC
LINEAR ACC IN G


NSHAS G-Z
TEST 508
14 NOV 80
SUBJECT S-3
CELL H
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
ISOLATED SYMBOL MARKS PREDROP POSITION
⊖ MOUTH PACK
▲ CHEEK
+ LOW HELMET
X SHOULDER
◆ ELBOW
↑ DIRECTION
OF IMPACT
Z POS. IN INCHES
44.00
40.00
36.00
32.00
28.00
24.00
20.00
14.00
16.00
18.00
20.00
22.00
24.00
26.00
28.00
30.00
X POS. IN INCHES

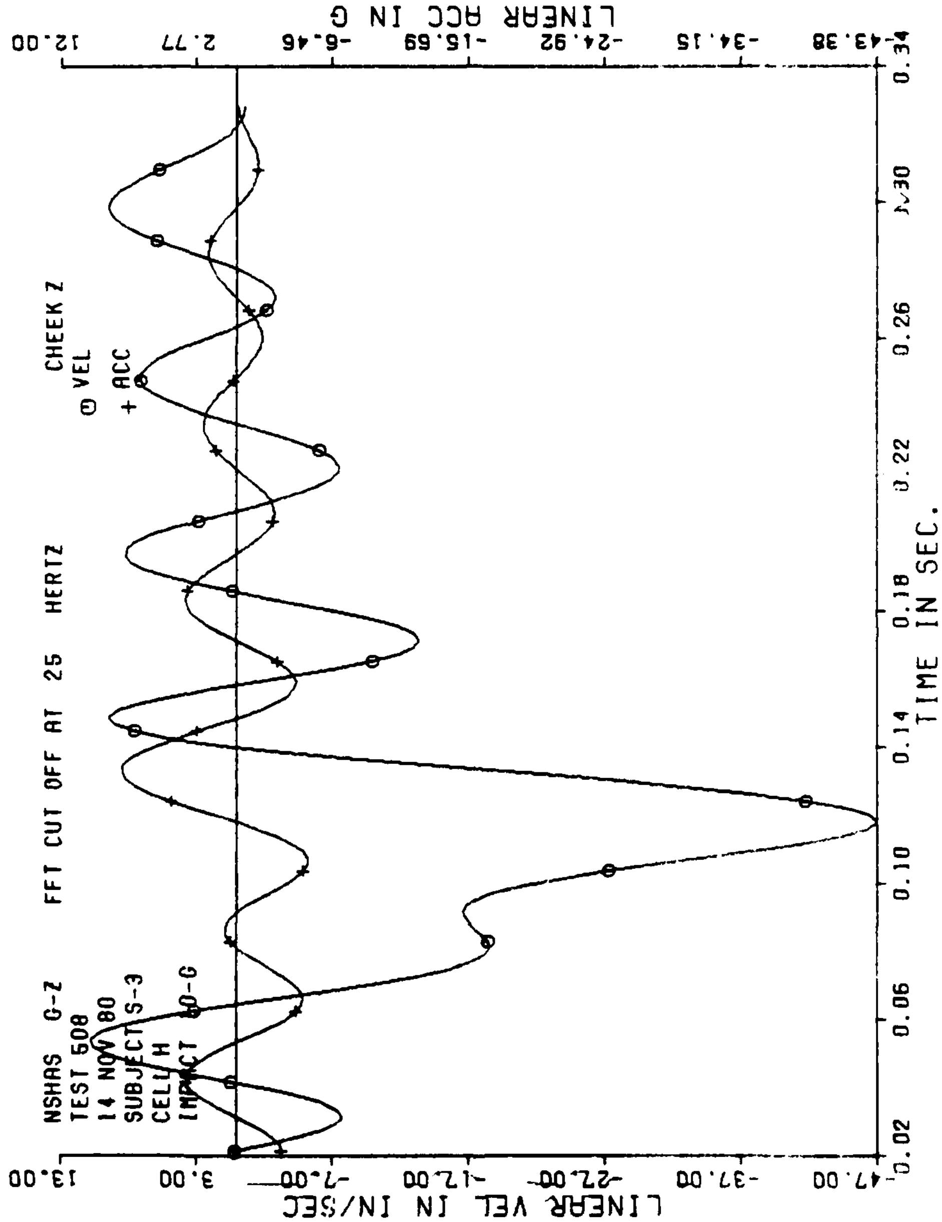


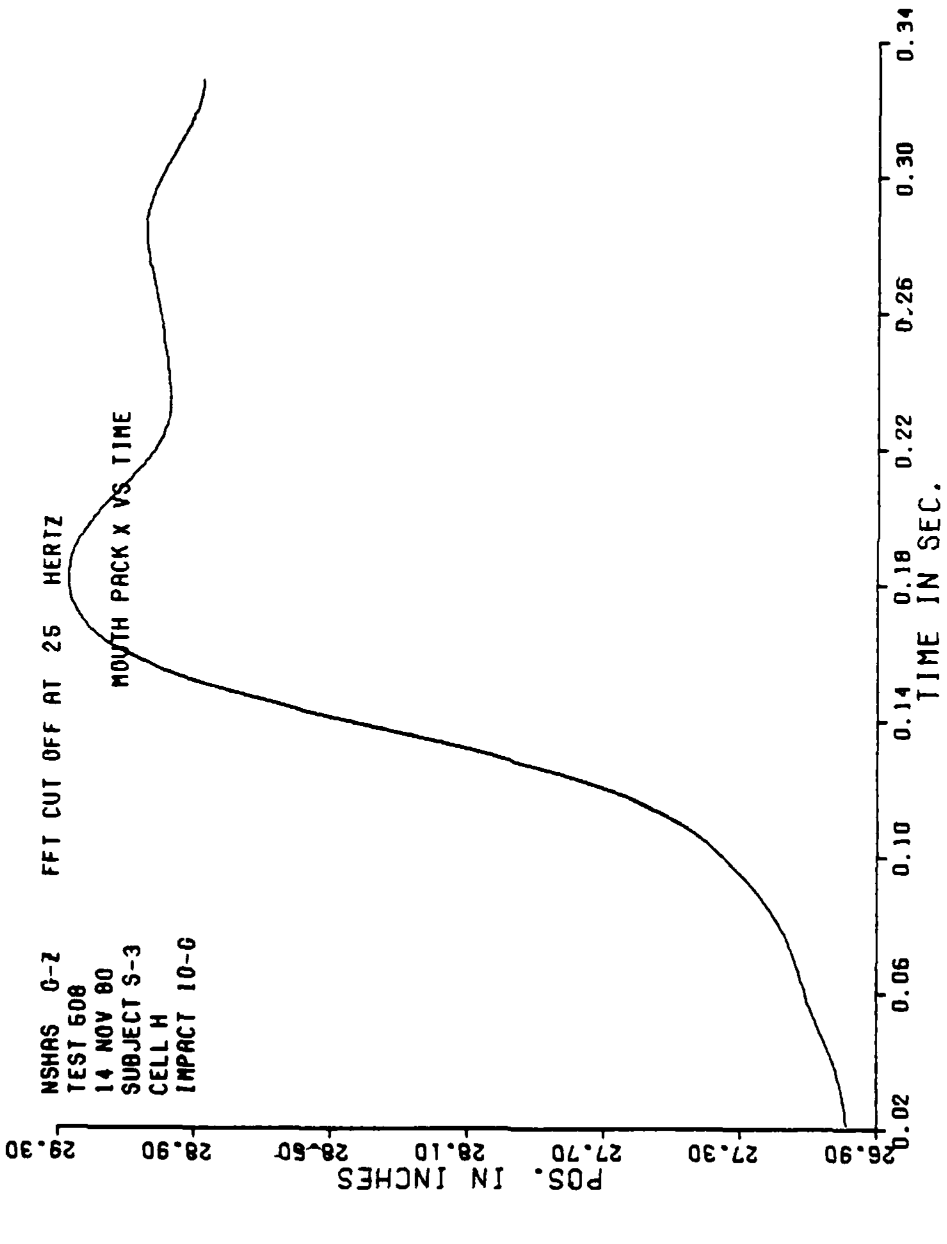
NSHAS G-Z
TEST 508
14 NOV 80
SUBJECT S-3
CELL H
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
CHEEK X VS TIME
POS. IN INCHES
TIME IN SEC.
24.40
24.80
25.20
25.60
26.00
26.40
26.80
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34

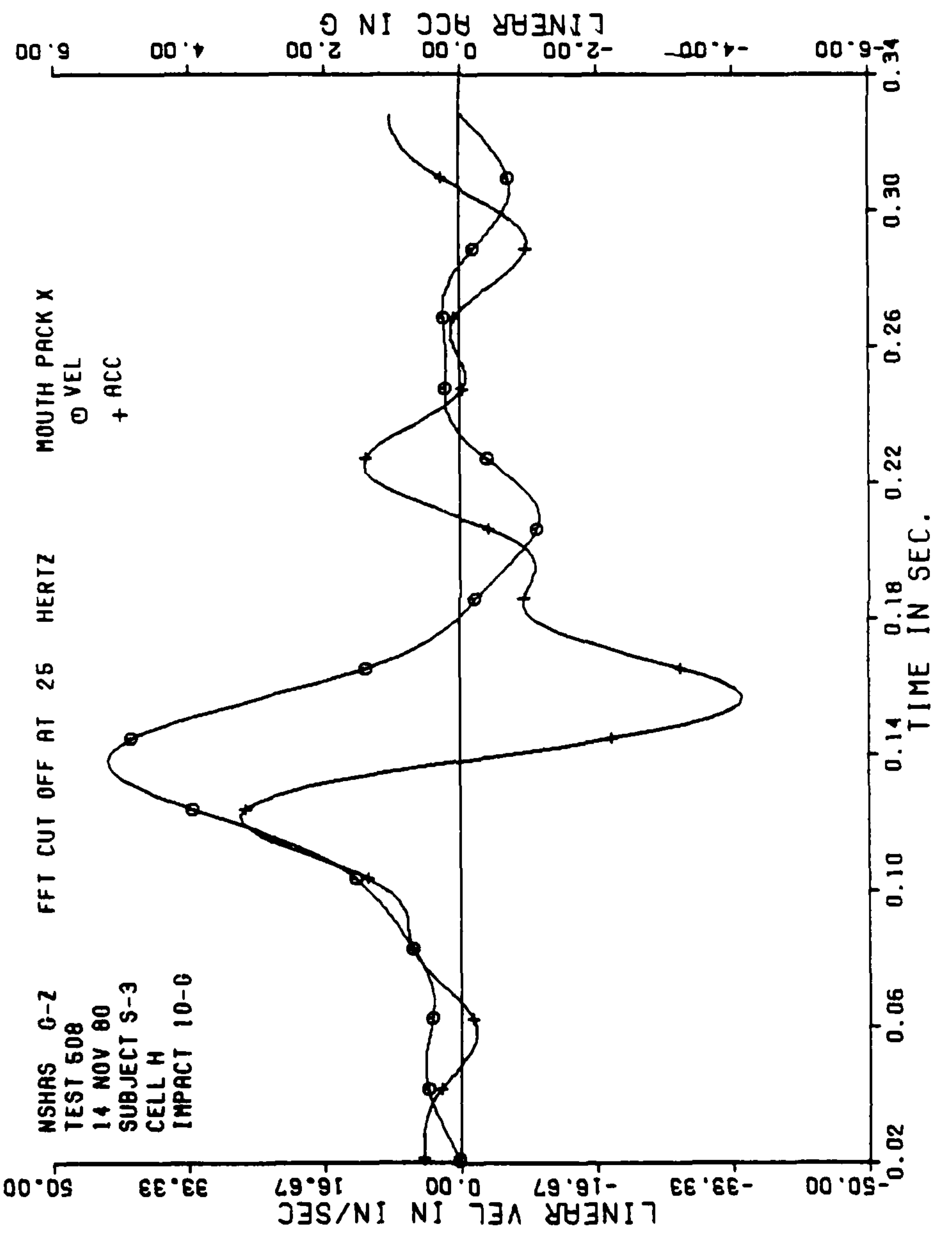

NSHAS G-Z
TEST 508
14 NOV 80
SUBJECT S-3
CELL H
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
CHEEK X
VEL
+ ACC
LINEAR VEL IN IN/SEC
40.00
26.67
13.33
0.00
-13.33
-26.67
-40.00
LINEAR ACC IN G
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
TIME IN SEC.
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34

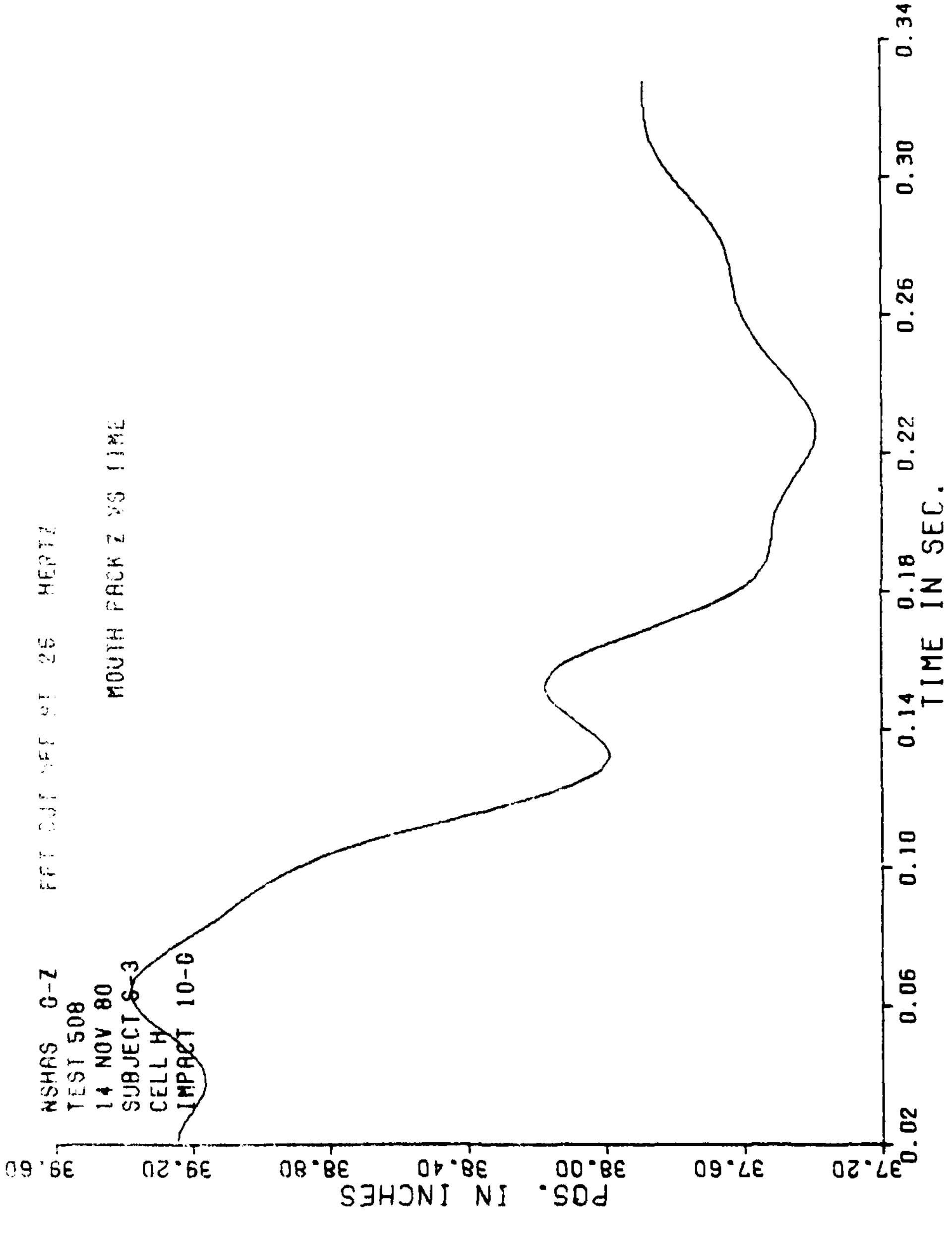


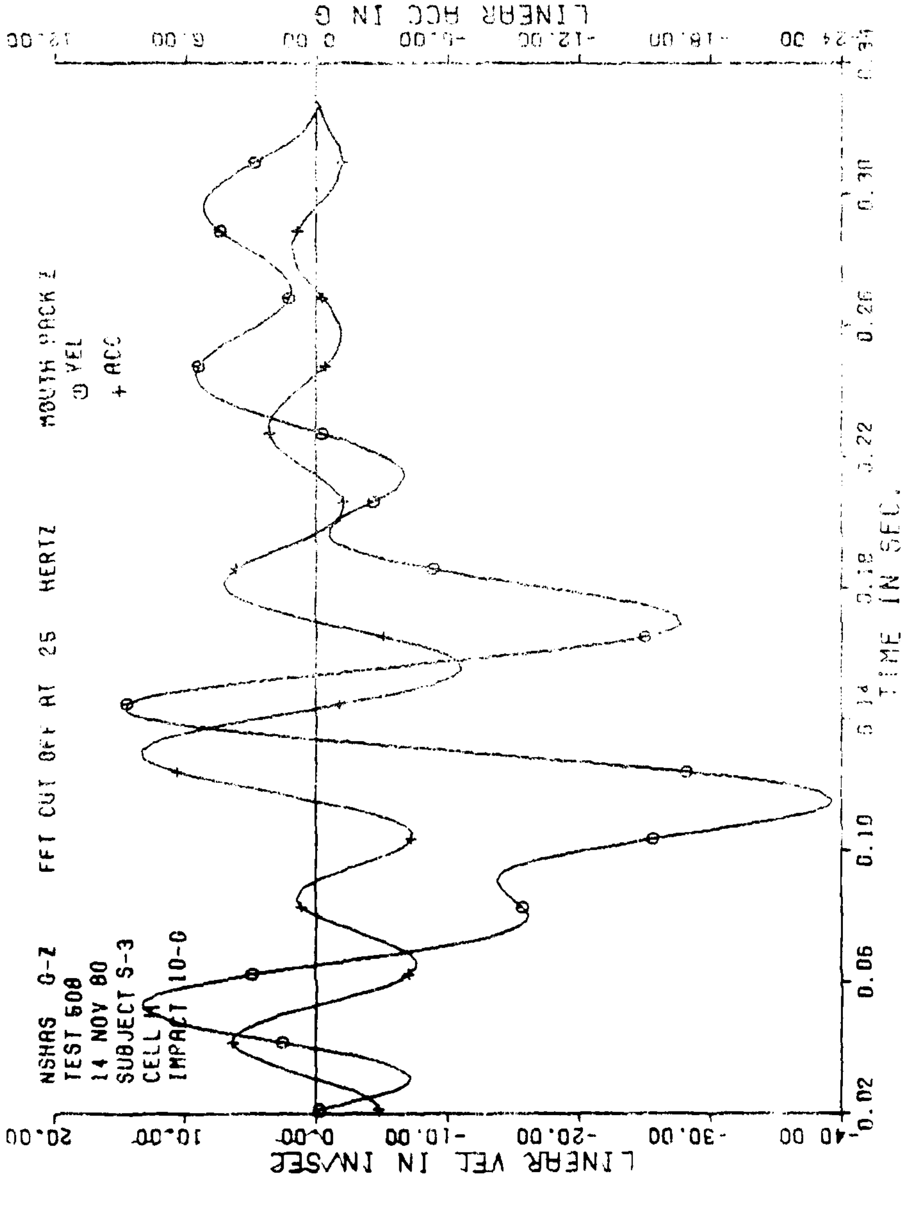
NSHAS G-Z
TEST 508
14 NOV 80
SUBJECT 6-3
CELL H
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
CHEEK Z VS TIME
POS. IN INCHES
42.00
41.60
41.20
40.80
40.40
40.00
39.60
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.

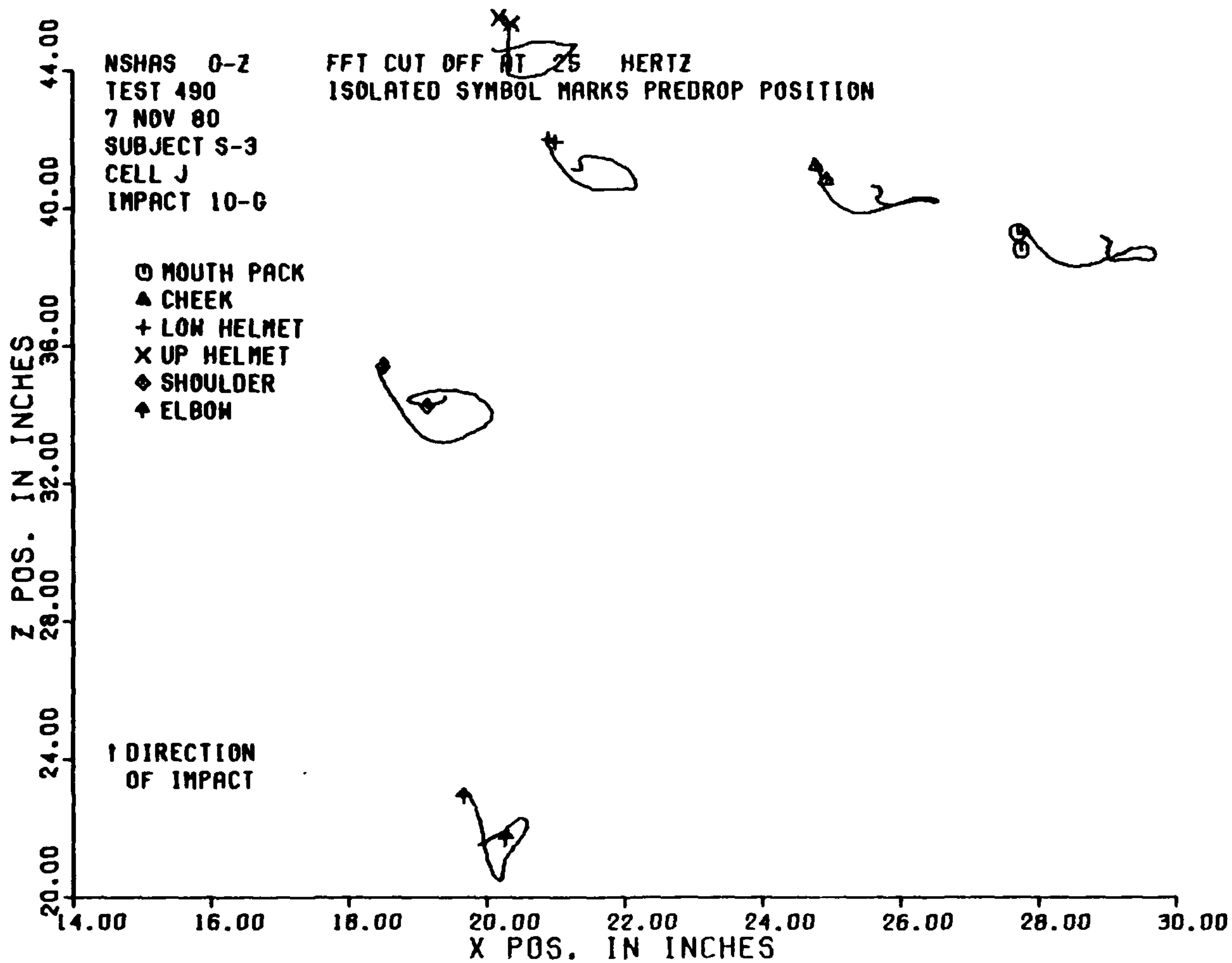

NSHAS G-Z
TEST 508
14 NOV 80
SUBJECT S-3
CELL H
FFT CUT OFF AT 25 HERTZ
CHEEK Z
VEL
+ ACC
TIME IN SEC.
LINEAR VEL IN IN/SEC
LINEAR ACC IN G

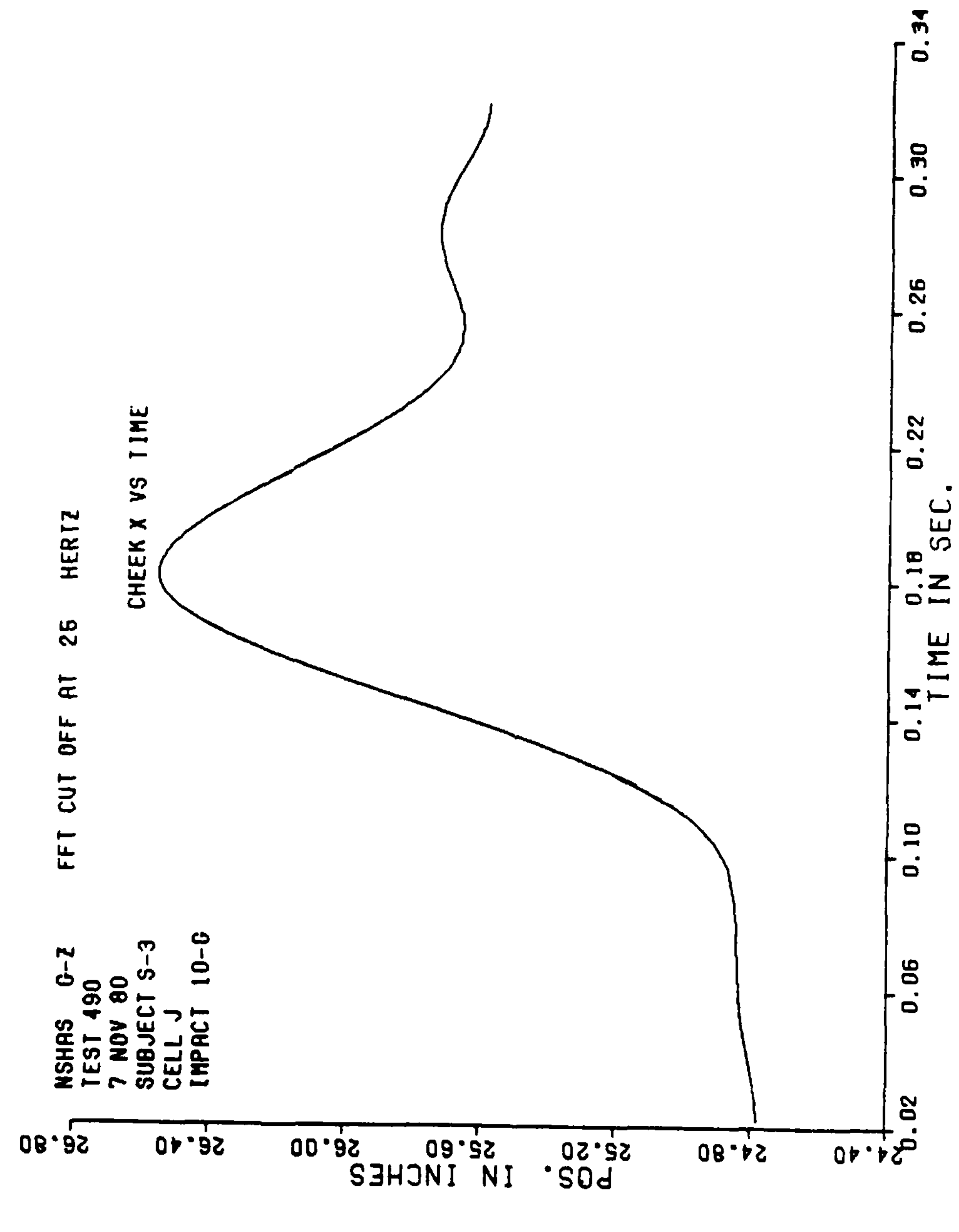

NSHAS G-Z
TEST 608
14 NOV 80
SUBJECT S-3
CELL H
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
MOUTH PACK X VS TIME
POS. IN INCHES
29.30
28.90
28.50
28.10
27.70
27.30
26.90
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.

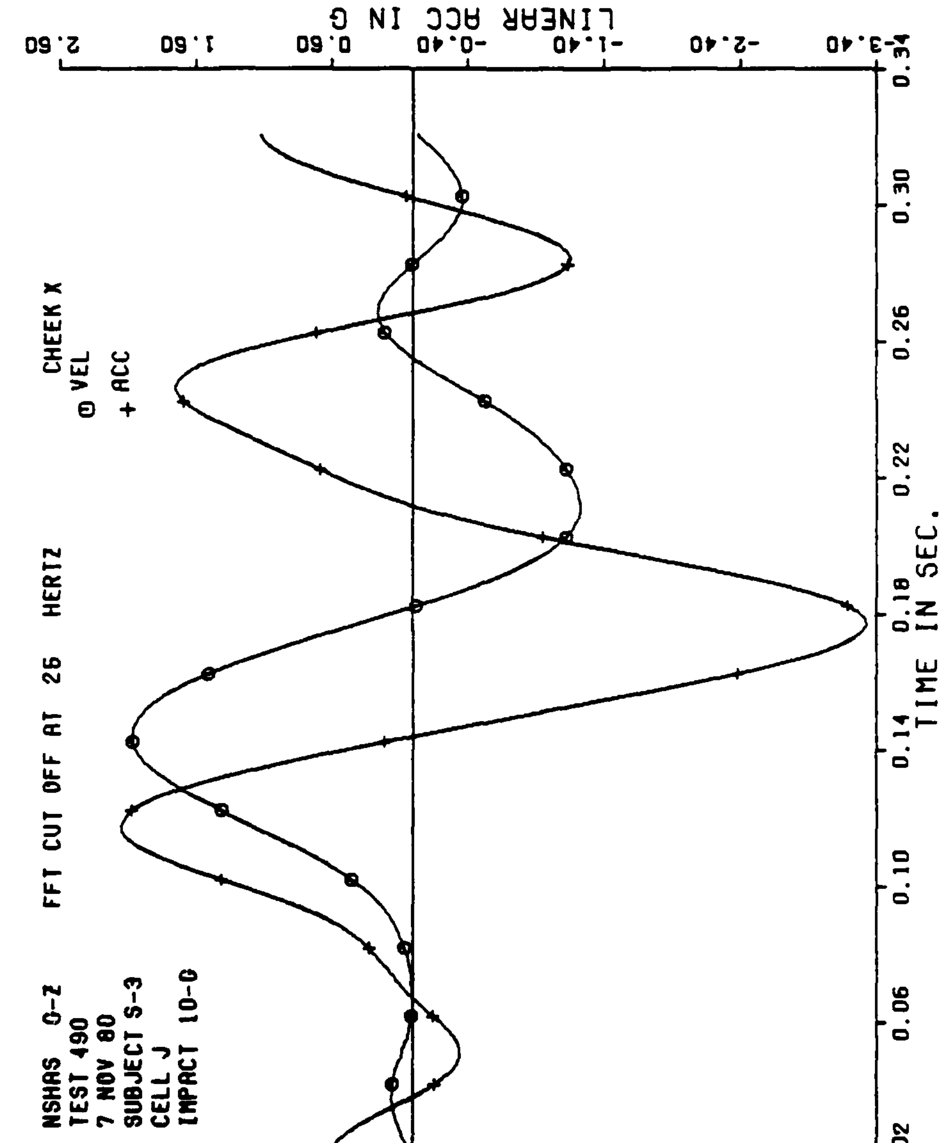

NSHAS G-Z
TEST 508
14 NOV 80
SUBJECT S-3
CELL H
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
MOUTH PACK X
VEL
+ ACC
LINEAR ACC IN G
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
LINEAR VEL IN IN/SEC
50.00
33.33
16.67
0.00
-16.67
-33.33
-50.00
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.

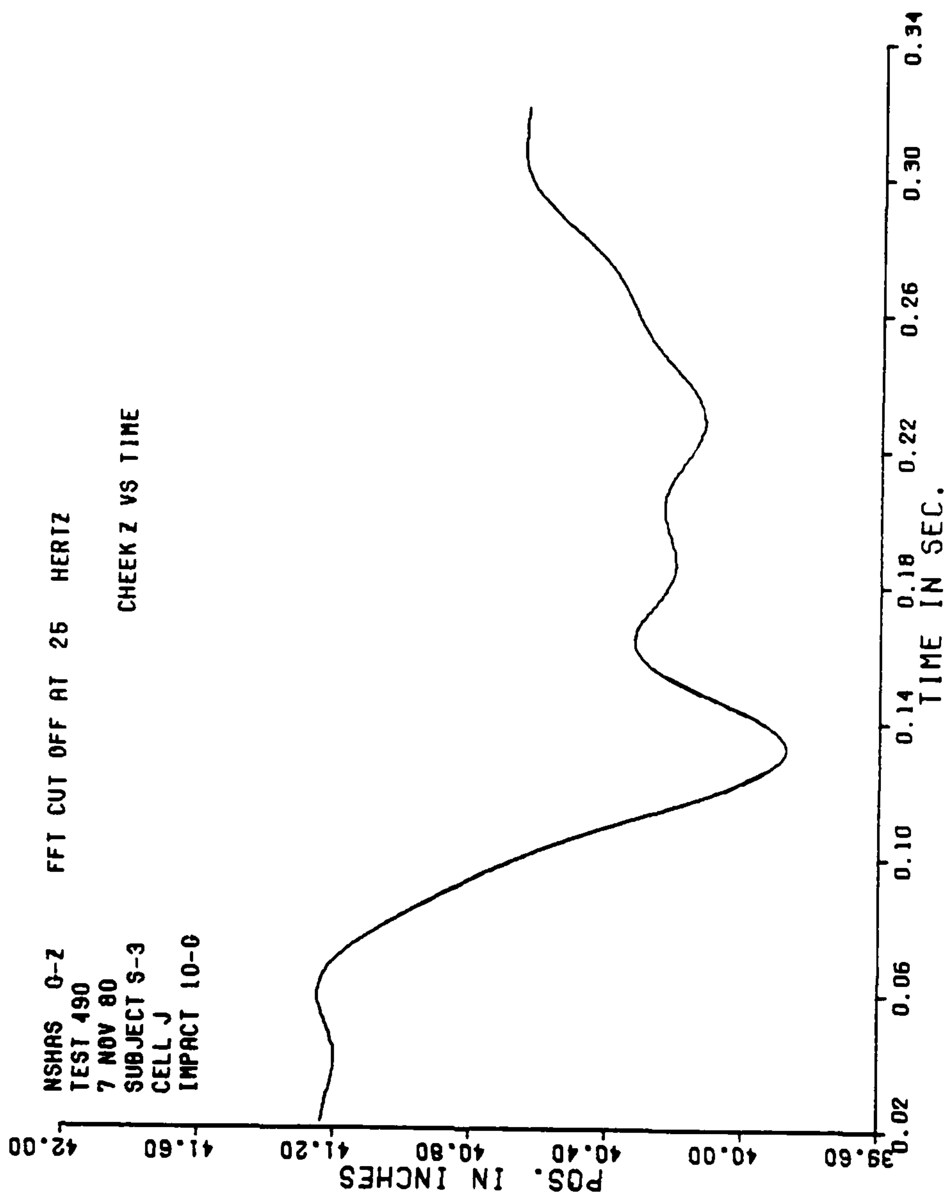

NSHAS G-Z
TEST 508
14 NOV 80
SUBJECT S-3
CELL H
IMPACT 10-G
MOUTH PACK Z VS TIME
POS. IN INCHES
39.60
39.20
38.80
38.40
38.00
37.60
37.20
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.

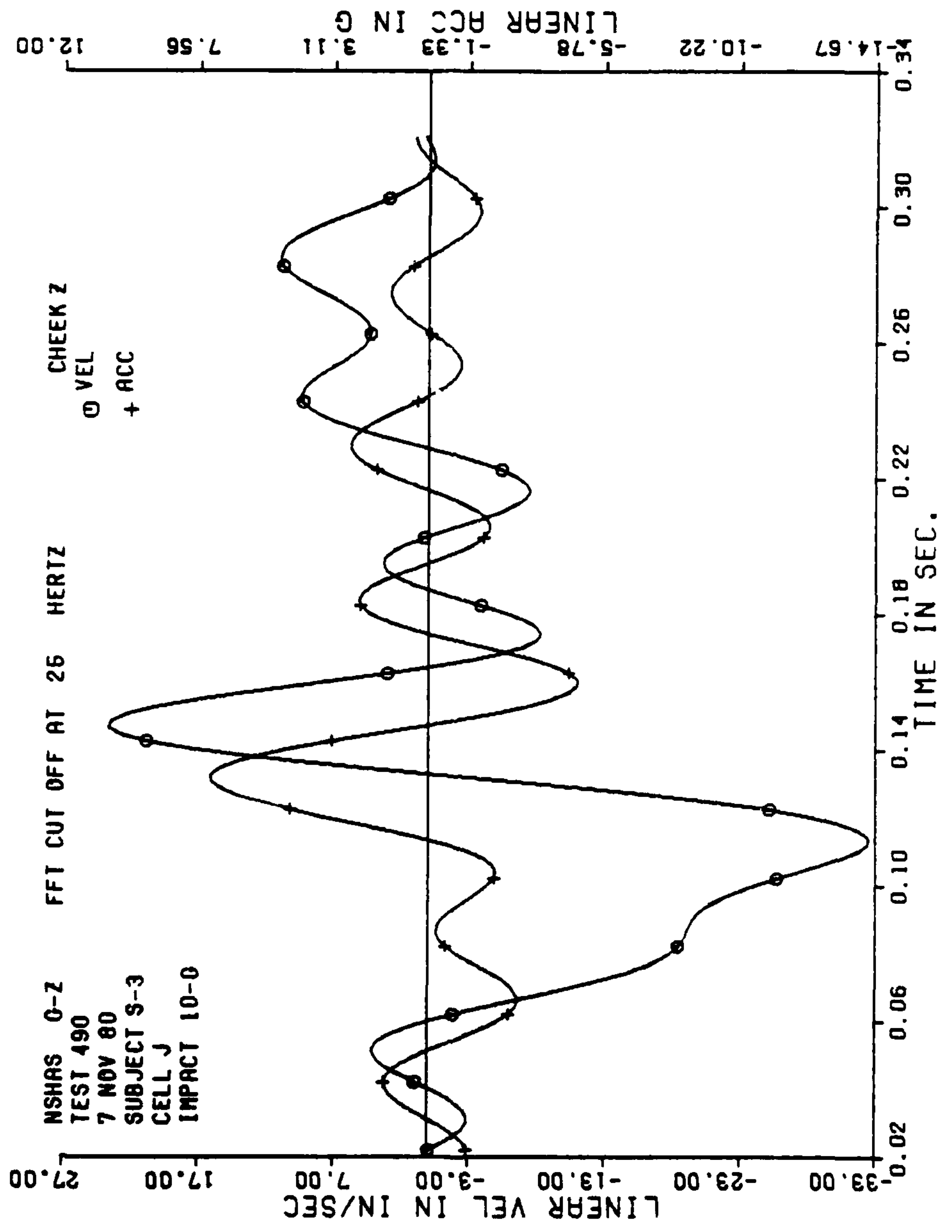

NSHAS G-Z
TEST 608
14 NOV 80
SUBJECT S-3
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
MOUTH PACK Z
VEL
+ ACC
LINEAR VEL IN IN/SEC
LINEAR ACC IN G
TIME IN SEC.
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
12.00
6.00
0.00
-6.00
-12.00
-18.00
-24.00
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30

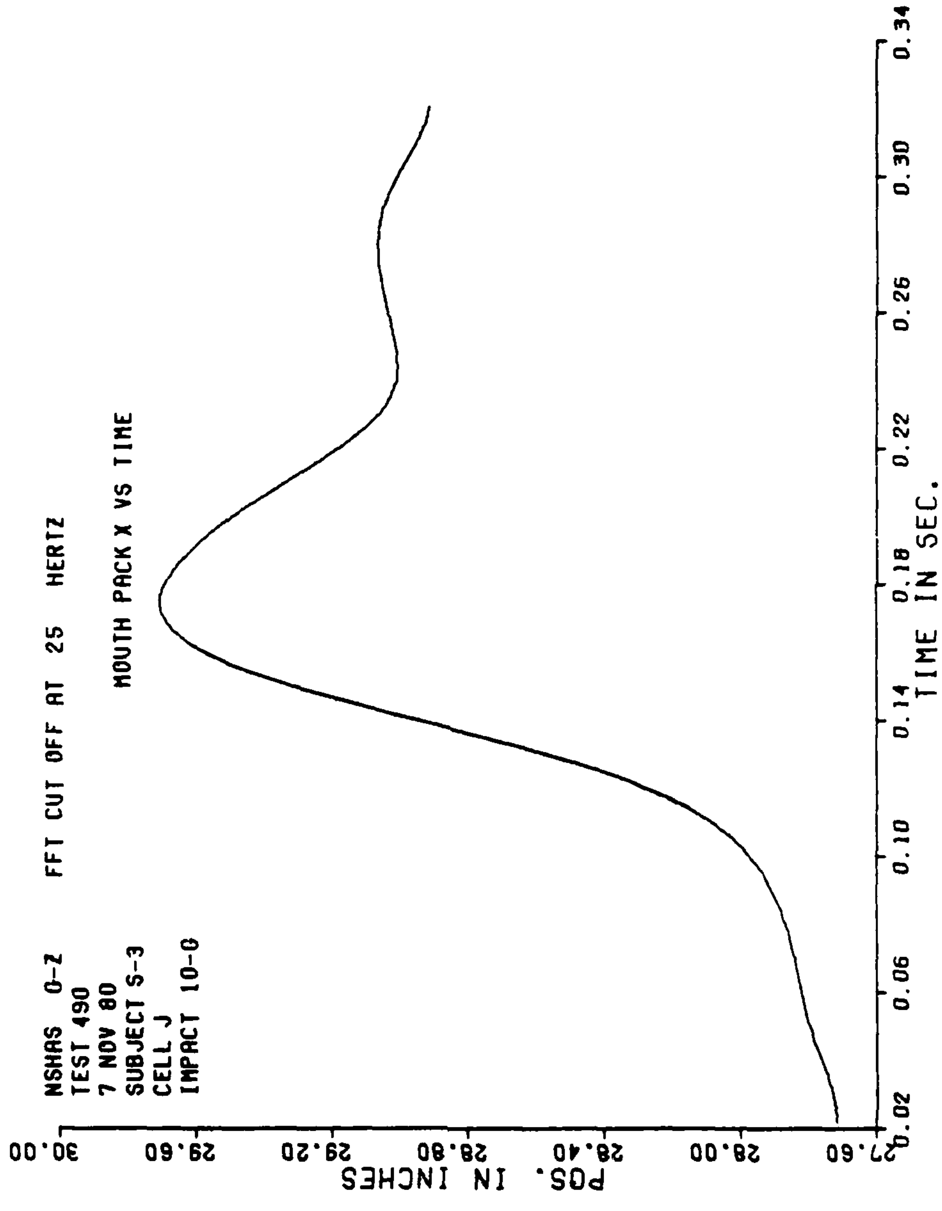

NSHAS O-Z
TEST 490
7 NOV 80
SUBJECT S-3
CELL J
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
ISOLATED SYMBOL MARKS PREDROP POSITION
MOUTH PACK
CHEEK
LOW HELMET
UP HELMET
SHOULDER
ELBOW
DIRECTION
OF IMPACT
Z POS. IN INCHES
44.00
40.00
36.00
32.00
28.00
24.00
20.00
14.00
16.00
18.00
20.00
22.00
24.00
26.00
28.00
30.00
X POS. IN INCHES

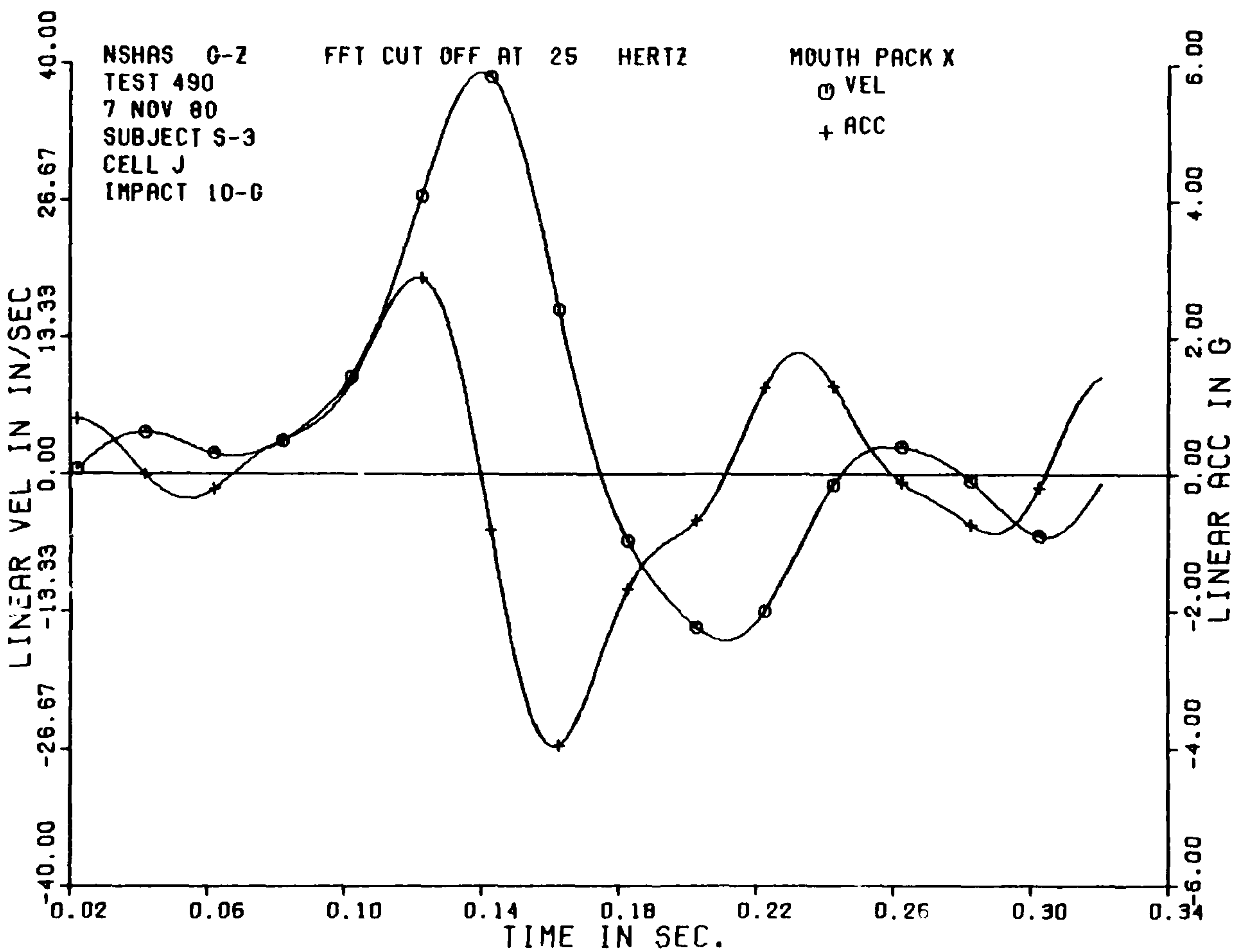

NSHAS G-Z
TEST 490
7 NOV 80
SUBJECT S-3
CELL J
IMPACT 10-G
FFT CUT OFF AT 26 HERTZ
CHEEK X VS TIME
POS. IN INCHES
24.40
24.80
25.20
25.60
26.00
26.40
26.80
TIME IN SEC.
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34


NSHAS O-Z
TEST 490
7 NOV 80
SUBJECT S-3
CELL J
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
CHEEK X
VEL
+ ACC
LINEAR ACC IN G
2.60
1.60
0.60
-0.40
-1.40
-2.40
-3.40
LINEAR VEL IN IN/SEC
40.00
24.62
9.23
-6.15
-21.54
-36.92
-52.31
TIME IN SEC.
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34


NSHAS 0-Z
TEST 490
7 NOV 80
SUBJECT S-3
CELL J
IMPACT 10-0
FFT CUT OFF AT 25 HERTZ
CHEEK Z VS TIME
POS. IN INCHES
TIME IN SEC.
42.00
41.60
41.20
40.80
40.40
40.00
39.60
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34


NSHAS O-Z
TEST 490
7 NOV 80
SUBJECT S-3
CELL J
IMPACT 10-0
FFT CUT OFF AT 25 HERTZ
CHEEK Z
VEL
+ ACC
TIME IN SEC.
LINEAR VEL IN IN/SEC
LINEAR ACC IN G
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
27.00
17.00
7.00
-3.00
-13.00
-23.00
-33.00
12.00
7.56
3.11
-1.33
-5.78
-10.22
-14.67


NSHAS 0-Z
TEST 490
7 NOV 80
SUBJECT S-3
CELL J
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
MOUTH PACK X VS TIME
POS. IN INCHES
30.00
29.60
29.20
28.80
28.40
28.00
27.60
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.


NSHAS G-Z
TEST 490
7 NOV 80
SUBJECT S-3
CELL J
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
MOUTH PACK X
VEL
ACC
40.00
26.67
13.33
0.00
-13.33
-26.67
-40.00
LINEAR VEL IN IN/SEC
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
LINEAR ACC IN G
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.

AD-A113 957   AIR FORCE AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATT--ETC F/G 1/3
COMPARATIVE VERTICAL IMPACT TESTING OF THE F/FB-111 CREW RESTRA--ETC(U)
MAR 82 B F HEARON, J W BRINKLEY, J H RADDIN

UNCLASSIFIED AFAMRL-TR-82-13 NL

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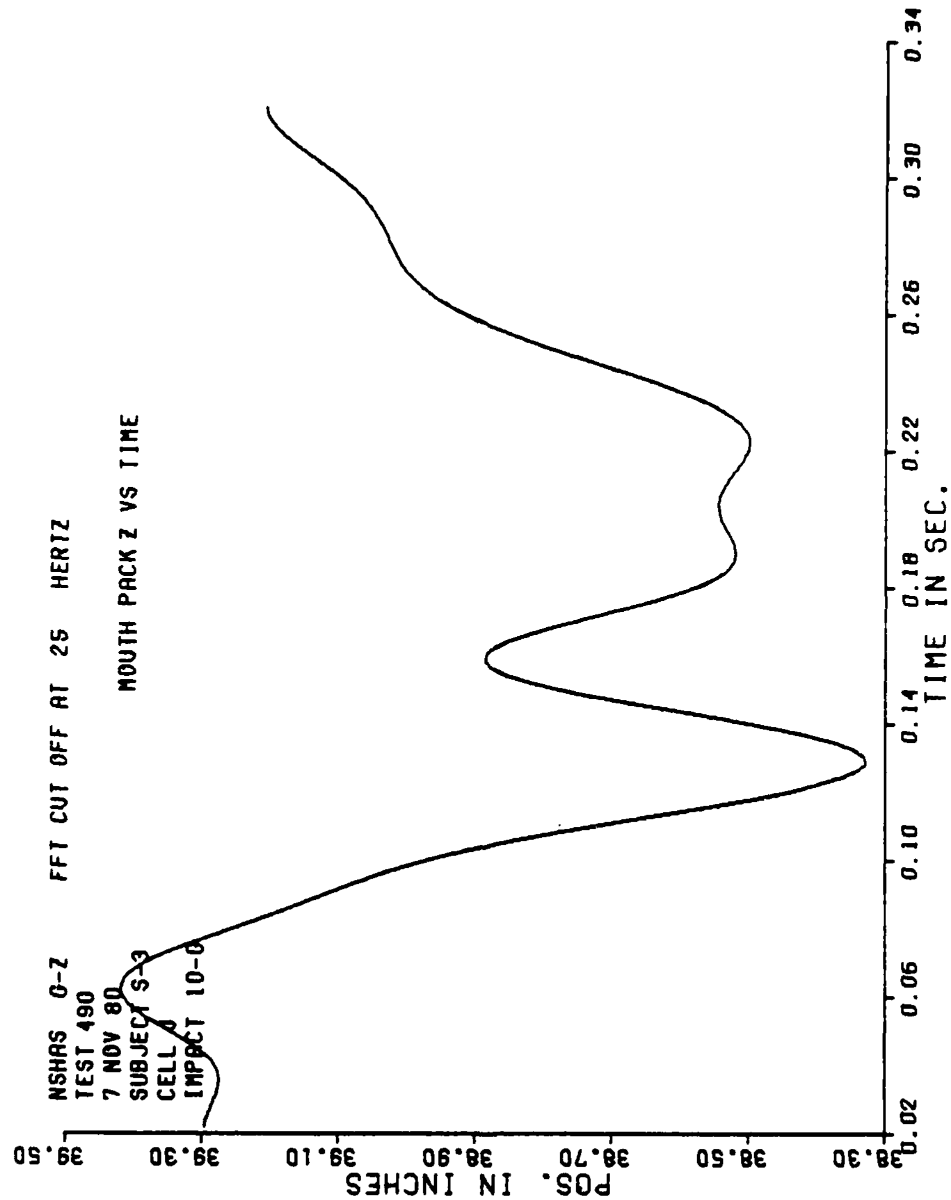
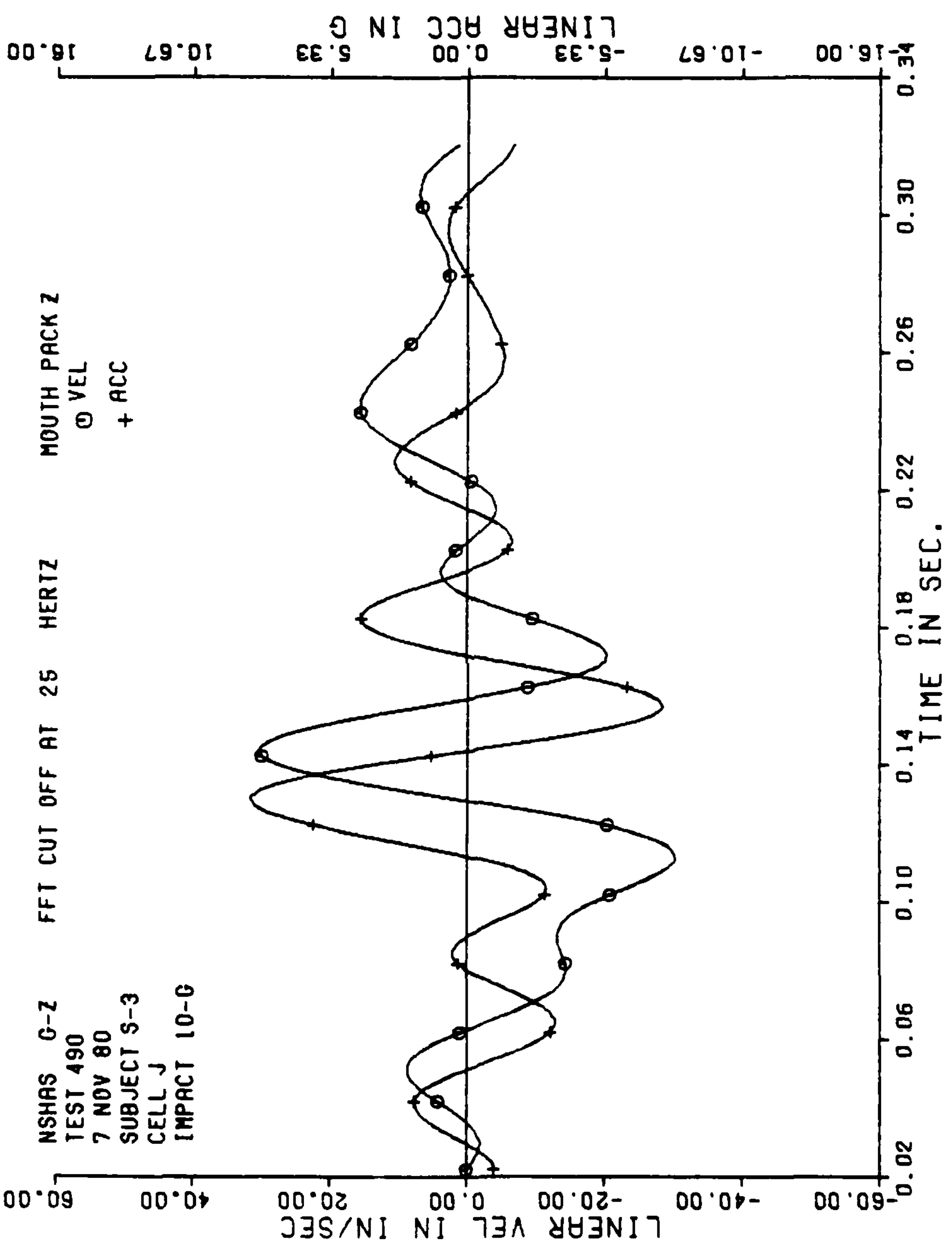


NSHAS 0-Z
TEST 490
7 NOV 80
SUBJECT S-3
CELL
FFT CUT OFF AT 25 HERTZ
MOUTH PACK Z VS TIME
POS. IN INCHES
39.50
39.30
39.10
38.90
38.70
38.50
38.30
TIME IN SEC.
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34


NSHAS G-Z
TEST 490
7 NOV 80
SUBJECT S-3
CELL J
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
MOUTH PACK Z
⊙ VEL
+ ACC
LINEAR ACC IN G
LINEAR VEL IN IN/SEC
TIME IN SEC.
16.00
10.67
5.33
0.00
-5.33
-10.67
-16.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34

APPENDIX E

PRETEST MEASUREMENT DATA

Inertia reel strap angles were measured by inclinometer for each subject who participated in this test program. Measurements were obtained in the operational and the modified F/FB-111 harnesses. (Due to scheduling conflicts, two subjects, D1 and M2, were not measured in the modified harness.) Measurements were obtained in three different seat back angle conditions and in as many as six different seat elevations for each seat back angle condition. Measurements for both the left and right inertia reel strap are provided. The seat elevations for which there were "contact" or "impingement" of the inertia reel straps with the lower aspect of the headrest are indicated. ("Contact" and "impingement" are defined in Section 2A of this report.)

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: D-1
SITTING HEIGHT: 39.7
MID-SHOULDER SITTING HEIGHT: 28.0

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

SEAT BACK ANGLE	FULL DOWN 0"		1"		2"		3"		4"		5" FULL UP	
	L	R	L	R	L	R	L	R	L	R	L	R
92°	-5	-3	Impingement -8	-7								
103°	0.5	1.5	-3	-2	Contact -9	-7	Impingement -11	-11				
110°	5	7	0.5	2.5	-3.0	-1.5	Contact -8	-7	Impingement -11.5	-11		

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

SEAT BACK ANGLE	FULL DOWN 0"		1"		2"		3"		4"		5" FULL UP	
	L	R	L	R	L	R	L	R	L	R	L	R
92°												
103°												
110°												

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: F-3
SITTING HEIGHT: 36.4
MID-SHOULDER SITTING HEIGHT: 25.5

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN											FULL UP
	0"		1"		2"		3"		4"		5"	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	5	6	1	1.5	-3.5	-2	Contact -6.5	-5				
103°	13	12.5	9.5	9	5	4	0	0	Contact -5	-4		
110°	15	16	12	13	8.5	8	4	4	0	+1	-4.5	-3

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN											FULL UP
	0"		1"		2"		3"		4"		5"	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	17	18	12	13.5	9	9.5	3	4	-2	-1	-6.5	-5.5
103°	24	25	20	20.5	14	15.5	9	10	3	4	-3	-2
110°	24	24	20	21.5	15	16	12	13	6.5	8	1	2

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: F-2
SITTING HEIGHT: 37.5
MID-SHOULDER SITTING HEIGHT: 26.3

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

FULL DOWN — FULL UP

SEAT BACK ANGLE	0" L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" L	5" R
92°	6	5.5	1.5	1.5	-3	-3.5	Impingement -7	-8				
103°	10	9	6.5	8.0	1	2	-3.5	-3.5	Contact -8.5	-8.0		
110°	15	17.5	11	12	6.5	7.0	1.0	3.0	-3.0	-3.0	Contact -8.0	-7.0

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

FULL DOWN — FULL UP

SEAT BACK ANGLE	0" L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" L	5" R
92°	16	16.5	11	11.5	7	6.5	2.5	2.5	-3.5	-2.5	Contact -7.5	-7.5
103°	23	24	19.5	20	15	16	10	10.5	3.5	4	-4.5	-3
110°	26	26.5	23	23.5	19	19.5	15	15.5	10	10.5	5	5.5

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: F-4
SITTING HEIGHT: 36.4
MID-SHOULDER SITTING HEIGHT: 24.7

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN											FULL UP
	0"		1"		2"		3"		4"		5"	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	6	5.5	1.5	3	-1	0	Contact -5	-5				
103°	9.5	9.5	5.5	6.5	1	1	-4.5	-4	-8	-6.5	Impingement	
110°	12	12	8	8	4	3	0	1	-5	-4	Contact -10	-9

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN											FULL UP
	0"		1"		2"		3"		4"		5"	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	17	18.5	12	13.5	7	8.5	3.5	5	-2	-1	Contact -8	-6.5
103°	25	26	21	22	15.5	17	11	12	4	5	-3	-2
110°	27	28.5	25	26.5	19.5	21	15	16.5	12	13	5	5.5

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: G-3
SITTING HEIGHT· 34.8
MID-SHOULDER SITTING HEIGHT: 25.0

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN 0"		1"		2"		3"		4"		5" FULL UP	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	10	10	6	6.5	2.5	2.0	-2.0	-2.0	Contact -5.0	-5.5		
103°	16	16.5	12.5	11.5	9.0	10	4	4	0.5	0.5	Contact -5	-4.5
110°	18	18	15	14	11.5	12	8.5	7.0	3.5	3.5	-0.5	-0.5

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN 0"		1"		2"		3"		4"		5" FULL UP	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	21	20.5	17.5	16	10.5	12	6	7.5	1	2	Contact -3	-3
103°	27	25.5	23	22	19	18	13.5	13.5	9	8.5	3	2
110°	27	28	24	25.5	20	20.5	15	15.5	10.5	11	5	6.5

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: G-2
SITTING HEIGHT: 33.3
MID-SHOULDER SITTING HEIGHT: 23.2

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT (FULL DOWN → FULL UP)

SEAT BACK ANGLE	0"		1"		2"		3"		4"		5"	
	L	R	L	R	L	R	L	R	L	R	L	R
92°	13	13.5	10	10	5	6	2	3	-2	-1	Impingement	
103°	17	18	14.5	16	9	10	5	6.5	1	2.5	-3	-2
110°	20	21.5	17.5	18.5	13.5	15	8.5	9	4.5	6.5	0	0

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT (FULL DOWN → FULL UP)

SEAT BACK ANGLE	0"		1"		2"		3"		4"		5"	
	L	R	L	R	L	R	L	R	L	R	L	R
92°	25	27	21	22	16	17	11.5	12	7	7.5	0	0
103°	33	32.5	28.5	30	25	26	20	22	15	17	8.5	9
110°	31	32.5	28.5	29.5	25	26.5	21.5	23	15.5	17.5	11	13

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: H-3
SITTING HEIGHT: 38.0
MID-SHOULDER SITTING HEIGHT: 26.1

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

SEAT BACK ANGLE	0" (FULL DOWN) L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" (FULL UP) L	5" R
92°	4.5	3.5	0	-0.5	Contact -3.5	-4	Impingement					
103°	8.0	7.5	3.0	3.0	-0.5	-1	Contact -6	-8	Impingement -8	-10		
110°	8.5	9.5	5	6.5	0.5	1.5	-3.5	-3.0	-8.0	-6.5	Impingement -13	-12.5

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

SEAT BACK ANGLE	0" (FULL DOWN) L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" (FULL UP) L	5" R
92°	16	15.5	12	11.5	6	5.5	1	2	-5	-3.5	Impingement	
103°	21	21	16.5	17	11.5	11.5	6.5	6.5	-1	-.5	-6	-5
110°	23	23.5	19.5	20	15	15	10.5	11	4	4.5	-1	-1.5

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: H-5
SITTING HEIGHT: 35.6
MID-SHOULDER SITTING HEIGHT: 24.1

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN 0"		1"		2"		3"		4"		FULL UP 5"	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	9.5	11.5	5.5	8.0	2	3.5	-2.0	-0.5				
103°	15	17.5	11	13	7	9	3.5	6.0	0	2.5	-7	Contact
110°	19	19.5	15.5	16.5	11.0	12.5	8	8	4	5	0	+1

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN 0"		1"		2"		3"		4"		FULL UP 5"	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	22.5	23	18	17	13.5	15	10	10.5	5	4.5	0	0
103°	29	31	25	26.5	22	22	15.5	17	11	11.5	-	6
110°	32	31.5	25	25.5	28	28.5	24	24.5	20	20	15	16

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: H-4
SITTING HEIGHT: 37.0
MID-SHOULDER SITTING HEIGHT: 25.7

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN 0"		1"		2"		3"		4"		5" FULL UP	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	4	3	0	0	Contact -4	-5.5	Impingement -8	-8.5				
103°	12	11	10.5	7.5	3	3	-.5	-2	Contact -5.5	-6.5	Impingement -11	-12
110°	15	14	11	11	8	6	3	2.5	-1	-2.5	Contact -7.5	-8.5

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN 0"		1"		2"		3"		4"		5" FULL UP	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	11	11.5	6	7.5	2	3.5	-2	-1	Contact -6	-4.5	Impingement	
103°	18.5	19.5	13	14.5	10	11	4	5.5	-2	-1	-8	-6.5
110°	21	22.5	16.5	18	11.5	13	7	8	0	+1.5	[illegible]	-2

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: K-1
SITTING HEIGHT: 35.7
MID-SHOULDER SITTING HEIGHT: 24.8

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

SEAT BACK ANGLE	0" (FULL DOWN) L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" (FULL UP) L	5" R
92°	4	5	0	1.5	Contact -3.5	-3.0	Impingement					
103°	10.5	12	6	7	2.5	3.5	-2.5	-1.5	Contact -7	-8		
110°	12	13	8.5	10	3	4	0	1	Contact -5	-4.5	Impingement	

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

SEAT BACK ANGLE	0" (FULL DOWN) L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" (FULL UP) L	5" R
92°	14	14	8	8.5	3.5	4	-2	-1.5	Contact -7	-6	Impingement	
103°	21	21.5	17	17.5	11	12	6.5	6	0	0	-7.5	-7
110°	23	22.5	18.5	19	15	15.5	10	11	4	5	-2	-1.5

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: M-2
SITTING HEIGHT: 35.2
MID-SHOULDER SITTING HEIGHT: 24.0

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

SEAT BACK ANGLE	0" (FULL DOWN)		1"		2"		3"		4"		5" (FULL UP)	
	L	R	L	R	L	R	L	R	L	R	L	R
92°	11.5	10.5	9.0	8.5	6.0	4.5	1.5	1.0	Contact -1.0	-3.5	Impingement -7.0	
103°	16	14.5	12.5	10.5	8.0	8.0	4.0	4.0	-1.0	0	Contact -5	-5.5
110°	15	16	13	13	8.5	9.0	6.0	6.5	2.0	1.5	-1.5	-1.5

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

SEAT BACK ANGLE	0" (FULL DOWN)		1"		2"		3"		4"		5" (FULL UP)	
	L	R	L	R	L	R	L	R	L	R	L	R
92°												
103°												
110°												

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: M-10
SITTING HEIGHT: 36.1
MID-SHOULDER SITTING HEIGHT: 24.8

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

FULL DOWN — FULL UP

SEAT BACK ANGLE	0" L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" L	5" R
92°	7	6.5	3.5	3	0	0	Contact -3.5	-4.5	Impingement -8	-8		
103°	+15	13.5	10	8.5	5	4	3	2	-2.5	-2.5	Impingement -7	-7.5
110°	16	16.5	12	11.5	11	9.5	6	5	1.5	.5	-2	-2.5

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

FULL DOWN — FULL UP

SEAT BACK ANGLE	0" L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" L	5" R
92°	19	19	14	13.5	9	9	3.5	2.5	-1	-1.5	Contact -6	-7.5
103°	28.5	29	24.5	25	20	20	13.5	14	10	8	0	-1
110°	26	27	22	22.5	18	18	15.5	13.5	7	7.5	3	2.5

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: M-11
SITTING HEIGHT: 35.7
MID-SHOULDER SITTING HEIGHT: 25.4

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

SEAT BACK ANGLE	0" (FULL DOWN) L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" (FULL UP) L	5" R
92°	8	6	4	3.5	-2	-2.5	Contact -4	-5	Impingement			
103°	14	13	8	8	5	5	1	.5	-4	-5	Contact -9	-9
110°	17	16	13	12.5	9	8.5	6	5	1	1	-4	-5

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

SEAT BACK ANGLE	0" (FULL DOWN) L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" (FULL UP) L	5" R
92°	20	19	16	15	12.5	11.5	8	7	3	2	-2	-3
103°	29	28	22.5	22	18.5	17.5	13.5	12	8	6.5	-2	-1
110°	28	27	22	21	18.5	18	14	13.5	9	9	5.5	5.5

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: M-13
SITTING HEIGHT: 37.3
MID-SHOULDER SITTING HEIGHT: 26.3

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN 0"		1"		2"		3"		4"		FULL UP 5"	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	4.0	2.5	0	0	Contact -4.0	-4.0	Impingement -8.0	-				
103°	9.0	8.0	6.0	5.5	1.0	2.0	Contact -3.0	-3.5	Impingement -8.0			
110°	12.5	13.5	7.5	9.0	6.0	7.0	1.0	2.5	-4.0	-2.5	Contact -6.5	-6.0

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN 0"		1"		2"		3"		4"		FULL UP 5"	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	12	10	6.5	6.5	+3	+2	-5	-2	Impingement			
103°	20	22.5	15	17	10	12	3.5	6.5	-1.5	0	-8	-5
110°	26	26	20	23	14	17	10	13	3.5	5.5	2	.5

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: P-3
SITTING HEIGHT: 39.1
MID-SHOULDER SITTING HEIGHT: 27.7

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

FULL DOWN … FULL UP

SEAT BACK ANGLE	0" L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" L	5" R
92°	Contact -5	-3.5	Impingement									
103°	0.5	0	-3.5	-1	Contact -9	-7	Impingement					
110°	6	8	2	3.5	-2.5	-.5	-7	-5	Contact -12	-10	Impingement	

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

FULL DOWN … FULL UP

SEAT BACK ANGLE	0" L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" L	5" R
92°	15	6	.5	1	-3	-4	Impingement					
103°	11	12	7	5.5	0	.5	-4	-5	Contact -11	-11	Impingement	
110°	18	17	12	11.5	8	7	3	3	-2.5	-3	-10	-9

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: R-2
SITTING HEIGHT: 35.9
MID-SHOULDER SITTING HEIGHT: 24.3

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN											FULL UP
	0"		1"		2"		3"		4"		5"	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	10	9	4	5	0	0.5	Contact -3.5	-4	Impingement			
103°	17.5	17	11	11	5.5	5.5	2.5	2.5	Contact -3	-3	Impingement	
110°	18.5	18	14	13.5	10.5	11	7	7	2	2	Contact -4	-3.5

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

	FULL DOWN											FULL UP
	0"		1"		2"		3"		4"		5"	
SEAT BACK ANGLE	L	R	L	R	L	R	L	R	L	R	L	R
92°	20	20	18.5	18.5	11	10	5	6	-5	0	Contact -5	-4.5
103°	27.5	28.5	23.5	24	19	19.5	13	14	8	7.5	0	0
110°	31	31	26.5	26	22.5	23	18	18.5	13	13.5	7.5	8

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: R-3
SITTING HEIGHT: 35.2
MID-SHOULDER SITTING HEIGHT: 23.9

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

FULL DOWN — FULL UP

SEAT BACK ANGLE	0" L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" L	5" R
92°	9	8	5	4.5	1	1	Contact -3.5	-3	Impingement			
103°	16	17	11	11	8	9	3	3	Contact 2	-3	Impingement -8	-9
110°	18	19	14	15	10	9	7.5	8	1.5	2.5	-2	-3

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

FULL DOWN — FULL UP

SEAT BACK ANGLE	0" L	0" R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" L	5" R
92°	19.5	20.5	15	16.5	10	11	6	7.5	1.5	2	-3	-2
103°	27	23	24	25	18.5	20	14.5	16	8.5	10	2	3
110°	29	29.5	25.5	26	20	21.5	15.5	16.5	10.5	11	6	7.5

MEASURED INERTIA REEL STRAP ANGLES

SUBJECT ID: S-3
SITTING HEIGHT: 36.6
MID-SHOULDER SITTING HEIGHT: 25.6

OPERATIONAL F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

SEAT BACK ANGLE	0" (FULL DOWN) L	0" (FULL DOWN) R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" (FULL UP) L	5" (FULL UP) R
92°	4	5.5	0	-1	-3.5	-3	Contact -8	-7	Impingement			
103°	9	10	5.5	6	.5	1.5	-4	-3	Contact -8	-8	Impingement	
110°	17	15	12	13.5	9	9.5	5	3.5	-5	-1	-5.5	-7

MODIFIED F-111 HARNESS

SEAT VERTICAL ADJUSTMENT

SEAT BACK ANGLE	0" (FULL DOWN) L	0" (FULL DOWN) R	1" L	1" R	2" L	2" R	3" L	3" R	4" L	4" R	5" (FULL UP) L	5" (FULL UP) R
92°	18	18	12.5	13	8	8.5	3	4	-2	-1	Contact -7.5	-6.5
103°	23.5	23.5	21	21	15.5	15.5	10	9.5	4.5	4.5	-3	-2
110°	25	24	21.5	20	16.5	17.5	12.5	12.5	7.5	7.5	2.5	2.5

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